



River road, Scudder's Falls, Mercer Co., before improvement.

TENTH ANNUAL REPORT

OF THE

Commissioner of Public Roads

FOR THE

Year Ending October 31st,

1903.

NEW JERSEY STATE LIBRARY



SOMERVILLE, N. J.:

THE UNIONIST GAZETTE ASSOCIATION, STATE PRINTERS.

1904.

OFFICE OF COMMISSIONER OF PUBLIC ROADS,
TRENTON, NEW JERSEY, November 30th, 1903.

To His Excellency Franklin Murphy, Governor, and the Legislature of New Jersey:

As required by the State Aid Road Law, I have the honor to submit the tenth annual report of the Commissioner of Public Roads for the fiscal year ending October 31st, 1903, with such comments, quotations and suggestions as existing circumstances seem to require.

H. I. BUDD,
Commissioner of Public Roads.

REPORT.

In compliance with the act of April 1st, 1903, we make a statement of cost of roads that will claim this year's appropriation, as indicated by the figures below:

COST OF ROADS.

ATLANTIC COUNTY.

Absecon and Chestnut Neck road.....		11 miles.
Cost	\$17,156 55	
State's share	5,718 85	
Pleasantville and Atlantic City road.....		2 miles.
Cost	\$31,959 25	
State's share	10,653 08	
Total number of miles.....		13
Total paid the county.....		\$16,371 93

BURLINGTON COUNTY.

Chesterfield road		2.81 miles.
Cost	\$17,392 54	
State's share	5,797 85	
Crosswicks and Bordentown road.....		3.19 miles.
Cost	\$19,804 15	
State's share	6,601 38	
Vincentown and Red Lion road.....		1.61 miles.
Cost	\$11,175 00	
State's share	3,725 00	
Moorestown and Masonville road.....		3.76 miles.
Cost	\$26,452 31	
State's share	8,817 44	
New Gretna road.....		8.15 miles.
Cost	\$6,527 61	
State's share	2,175 87	
Beverly and Burlington road.....		2.16 miles.
Cost	\$15,691 62	
State's share	5,230 54	
Piper's Corner and Indian Mills road.....		4.00 miles.
Cost	\$5,823 33	
State's share	1,941 11	
Burlington and Columbus road (second section).....		2.30 miles.
Cost	\$11,061 05	
State's share	3,687 02	
Total number of miles.....		27.98
Total paid the county.....		\$37,976 20

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CAMDEN COUNTY.

Haddonfield and Mount Ephraim road (second section).....		1.44 miles.
Cost	\$12,500 00	
State's share	4,166 67	
Stoy's Landing road.....		.67 miles.
Cost	\$4,192 45	
State's share	1,397 48	
Camden and Blackwood turnpike.....		7.39 miles.
Cost	\$10,000 00	
State's share	3,333 33	
Total number of miles.....		9.50
Total paid the county.....		\$8,897 48

CAPE MAY COUNTY.

Seashore road		3.86 miles.
Cost	\$12,601 58	
State's share	4,200 53	
Rio Grande and Holly Beach road.....		2.34 miles.
Cost	\$14,500 00	
State's share	4,833 33	
Total number of miles.....		6.20
Total paid the county.....		\$9,033 86

CUMBERLAND COUNTY.

Mauricetown Bridge road.....		1.22 miles.
Cost	\$21,469 62	
State's share	7,156 54	
Total number of miles.....		1.22
Total paid the county.....		\$7,156 54

ESSEX COUNTY.

Dutch lane		2.59 miles.
Cost	\$16,881 35	
State's share	5,627 12	
Grove street		2.07 miles.
Cost	\$18,255 19	
State's share	6,085 06	
Ridgewood avenue		1.13 miles.
Cost	\$8,966 80	
State's share	2,988 94	
Total number of miles.....		5.79
Total paid the county.....		\$14,701 12

COMMISSIONER OF PUBLIC ROADS. 7

GLOUCESTER COUNTY.

Main street, Williamstown.....		1.77 miles.
Cost	\$3,800 00	
State's share	1,266 67	
Clayton and Williamstown road.....		5.96 miles.
Cost	\$10,400 00	
State's share	3,466 67	
Total number of miles.....		7.73
Total paid the county.....		\$4,733 34

MERCER COUNTY.

River road		5.95 miles.
Cost	\$41,653 00	
State's share	13,884 33	
Marshall's Corner and Woodsville road.....		2.43 miles.
Cost	\$28,586 70	
State's share	9,528 90	
Centerville road		1.97 miles.
Cost	\$12,890 64	
State's share	4,296 88	
Shabakunk road		1.95 miles.
Cost	\$13,875 58	
State's share	4,625 20	
Total number of miles.....		12.30
Total paid the county.....		\$32,335 31

MIDDLESEX COUNTY.

Oak Tree and Iselin road.....		1.25 miles.
Cost	\$10,604 04	
State's share	3,534 68	
New Durham road.....		1.00 mile.
Cost	\$5,350 40	
State's share	1,783 47	
Plainsboro and Aqueduct road.....		1.52 miles.
Cost	\$8,320 05	
State's share	2,773 35	
Red Tavern or Applegarth road.....		1.00 mile.
Cost	\$2,495 64	
State's share	831 88	
New Brunswick and Bound Brook road.....		2.50 miles.
Cost	\$12,974 00	
State's share	4,324 66	
Sayreville and South Amboy road.....		2.25 miles.
Cost	\$8,703 00	
State's share	2,901 00	
Total number of miles.....		9.52
Total paid the county.....		\$16,149 04

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MONMOUTH COUNTY.

Corliss avenue		4.47 miles.
Cost	\$17,309 50	
State's share	5,769 83	
Second, John, Church and Front streets, Keyport.....		.78 miles.
Cost	\$5,102 30	
State's share	1,700 77	
Manalapan and Freehold road (first section).....		2.92 miles.
Cost	\$23,205 00	
State's share	7,735 00	
Manasquan River and Belmar road.....		6.29 miles.
Cost	\$11,156 06	
State's share	3,718 69	
Ocean avenue, North Long Branch.....		1.76 miles.
Cost	\$19,962 58	
State's share	6,654 19	
Extension of Navesink road.....		2.32 miles.
Cost	\$9,300 00	
State's share	3,100 00	
Main street, Matawan.....		1.50 miles.
Cost	\$12,660 91	
State's share	4,220 30	
Total number of miles.....		20.04
Total paid the county.....		\$32,898 78

MORRIS COUNTY.

Green Village road.....		3.40 miles.
Cost	\$21,377 30	
State's share	7,125 77	
Newark and Pompton turnpike.....		.75 miles.
Cost	\$2,846 25	
State's share	948 75	
Sussex and Newton turnpike.....		1.07 miles.
Cost	\$10,306 60	
State's share	3,435 53	
Lincoln Park, Montville and Boonton road (first section)....		1.34 miles.
Cost	\$6,844 77	
State's share	2,281 59	
Mount Freedom road or Newton turnpike.....		.57 miles.
Cost	\$13,644 43	
State's share	4,548 14	
Total number of miles.....		7.13
Total paid the county.....		\$18,339 78

COMMISSIONER OF PUBLIC ROADS.

OCEAN COUNTY.

Little Egg Harbor Shore road (first section).....		2.04 miles.
Cost	\$5,595 55	
State's share	1,865 18	
Little Egg Harbor Shore road (second section).....		1.25 miles.
Cost	\$2,323 97	
State's share	774 66	
Little Egg Harbor Shore road (third section).....		2.11 miles.
Cost	\$6,338 10	
State's share	2,112 70	
Sea avenue .....		.87 miles.
Cost	\$2,925 87	
State's share	975 29	
Lakewood road (first section).....		3.70 miles.
Cost	\$18,498 00	
State's share	6,166 00	
Total number of miles.....		9.97
Total paid the county.....		\$11,893 83

PASSAIC COUNTY.

East Thirty-first street.....		1.00 mile.
Cost	\$5,479 20	
State's share	1,826 40	
Squaw Brook road.....		1.46 miles.
Cost	\$4,062 03	
State's share	1,354 01	
Macopin road		2.75 miles.
Cost	\$8,653 12	
State's share	2,884 37	
Clove road .....		.88 miles.
Cost	\$6,195 53	
State's share	2,065 18	
Total number of miles.....		6.09
Total paid the county.....		\$8,129 96

SALEM COUNTY.

Elmer and Alloway road.....		3.87 miles.
Cost	\$9,938 37	
State's share	3,312 79	
Salem and Hancock's Bridge road.....		.74 miles.
Cost (extra depth of shells).....	\$1,033 01	
State's share	344 34	
Total number of miles.....		4.61
Total paid the county.....		\$3,657 13

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SOMERSET COUNTY.

Neshanic road		6.24 miles.
Cost	\$40,009 17	
State's share	13,336 39	
Total number of miles.....		6.24
Total paid the county.....		\$13,336 39

SUSSEX COUNTY.

Sussex and Newton road.....		1.50 miles.
Cost	\$6,661 78	
State's share	2,220 59	
Stanhope and Newton road.....		1.53 miles.
Cost	\$8,329 49	
State's share	2,776 50	
Sparta and Newton road.....		1.00 mile.
Cost	\$4,346 05	
State's share	1,448 68	
Total number of miles.....		4.05
Total paid the county.....		\$6,445 77

WARREN COUNTY.

Danville road (first section).....		1.20 miles.
Cost	\$6,262 68	
State's share	2,087 56	
Stewartsville road (first section).....		1.28 miles.
Cost	\$9,557 34	
State's share	3,185 78	
Straw Church road.....		1.46 miles.
Cost	\$8,010 59	
State's share	2,670 20	
Total number of miles.....		3.94
Total paid the county.....		\$7,943 54
Total number of miles paid for in 1903.....		155.29
Total cost to the State.....		\$250,000 00
Appropriation		\$250,000 00

The following roads are approaching completion, but were not finished in time to receive the State's aid in 1903:

ATLANTIC COUNTY.

	<i>No. of Miles.</i>	<i>Cost.</i>
Pleasantville and Atlantic City.....	3.58	\$100,000 00

CAPE MAY COUNTY.

Ocean City turnpike	2.23	\$14,000 00
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COMMISSIONER OF PUBLIC ROADS. 11

ESSEX COUNTY.

Hobart's Gap	4.00	\$34,404 90
Swamp	5.00	40,424 20
	<u>9.00</u>	<u>\$74,829 10</u>

HUDSON COUNTY.

Belleville turnpike	2.32	\$54,650 00
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MERCER COUNTY.

Extension of Scotch	1.95	\$13,500 00
Princeton Hill70	8,400 00
Harbourton	1.70	12,281 00
	<u>4.35</u>	<u>\$34,181 00</u>

MIDDLESEX COUNTY.

Landing Bridge and New Market.....	1.50	\$8,495 86
Bridge approach, Ridgeway avenue and Fourth street,	1.25	14,000 00
	<u>2.75</u>	<u>\$22,495 86</u>

MORRIS COUNTY.

Randolph township section of Newton turnpike.....	3.04	\$24,000 00
Lincoln Park, Montville and Boonton (second section),	2.94	7,100 00
	<u>5.98</u>	<u>\$31,100 00</u>

OCEAN COUNTY.

Eagleswood Main Shore	3.05	\$7,228 10
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PASSAIC COUNTY.

Paterson and Hamburg turnpike.....	3.71	\$11,895 00
Squirrel Woods60	9,572 50
Barbour street .....	.44	2,622 50
Mountain View and Singac	2.47	12,325 25
	<u>7.22</u>	<u>\$36,415 25</u>

SUSSEX COUNTY.

Tuttle's Corner	1.69	\$12,282 00
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WARREN COUNTY.

Danville (second section)	3.67	\$17,324 69
Stewartsville (second section)	2.43	13,626 62
	<u>6.10</u>	<u>\$30,951 31</u>

Total number of miles approaching completion..... 48.27
 Total cost \$418,132 62

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Specifications for the following roads have been and are being prepared, some of which are under and are being placed under contract for construction, and will claim the State's appropriation for the fiscal year beginning November 1st, 1903, and ending October 31st, 1904:

BERGEN COUNTY.		
	<i>Miles.</i>	<i>Est. Cost.</i>
Ridgewood avenue	2.22	\$9,000 00
Midland avenue	1.58	6,300 00
	3.80	\$15,300 00
BURLINGTON COUNTY.		
Mount Holly and Eayerstown	2.50	\$15,000 00
Lumberton and Cross Roads.....	3.25	19,500 00
	5.75	\$34,500 00
CAMDEN COUNTY.		
Haddonfield and Gibbsboro	5.00	\$25,000 00
Cove	1.78	9,000 00
Clementon	1.40	7,000 00
	8.18	\$41,000 00
ESSEX COUNTY.		
Mount Pleasant avenue	1.12	\$9,000 00
Northfield and Morehousetown	1.75	14,000 00
South Orange avenue to Passaic river.....	1.13	9,500 00
Stuyvesant avenue, Irvington	2.75	22,000 00
Pier lane, Caldwell	1.00	8,000 00
	7.75	\$62,500 00
MERCER COUNTY.		
Trenton and New Brunswick turnpike.....	8.80	\$52,800 00
Hamilton Square and White Horse.....	3.70	22,200 00
Trenton and Princeton turnpike.....	8.30	49,800 00
Whitehead's Mill	1.00	6,000 00
Olden avenue	2.30	13,800 00
Liberty street	1.20	7,200 00
Vankirk	5.00	30,000 00
Mercerville and Lawrence Station.....	3.20	19,200 00
Yardville and Allentown turnpike.....	3.40	20,400 00
Grover's Mill	1.90	11,400 00
Windsor and Sharon	3.00	18,000 00
Pennington and Washington's Crossing	5.00	30,000 00
Extension Trenton and Allentown turnpike.....	3.20	19,200 00
	50.00	\$300,000 00

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MIDDLESEX COUNTY.

	<i>Miles.</i>	<i>Est. Cost.</i>
South Amboy and Keyport	1.00	\$6,500 00
Franklin Park (one-half)	2.87	17,500 00
Inter County (one-half) .....	.63	4,000 00
Lawrence Harbor	2.00	4,000 00
Oak Tree and Iselin (second section).....	1.41	13,000 00
Woodbridge and Iselin	2.50	20,000 00
Extension of Sayreville	2.53	13,330 00
	<hr/>	<hr/>
	11.94	\$78,330 00

MONMOUTH COUNTY.

Corliss avenue (second section).....	2.37	\$4,000 00
Manalapan and Freehold (second section).....	3.38	24,500 00
Allentown and New Egypt	8.16	50,000 00
Blue Ball and Lakewood.....	8.16	20,000 00
Old Bridge .....	.64	4,800 00
Colts Neck and Freehold	5.28	32,000 00
Asbury avenue	3.54	32,000 00
	<hr/>	<hr/>
	31.53	\$167,300 00

OCEAN COUNTY.

Stafford Township road (first section).....	2.31	\$5,350 00
Stafford Township road (second section).....	2.66	7,670 00
Eagleswood Main Shore road.....	3.05	7,230 00
Ocean Township Shore road.....	3.22	11,000 00
Union Township road	3.25	6,900 00
	<hr/>	<hr/>
	14.49	\$38,150 00

SALEM COUNTY.

Salem and Pennsville	5.87	\$40,000 00
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SOMERSET COUNTY.

Mountain avenue, Bound Brook.....	1.38	\$8,500 00
Blazier's Corner and Davis Bridge.....	3.21	19,000 00
Far Hills and Peapack	4.25	26,000 00
Franklin Park (one-half)	2.87	17,500 00
Inter County (one-half)63	4,000 00
	<hr/>	<hr/>
	12.34	\$75,000 00

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SUSSEX COUNTY.

	<i>Miles.</i>	<i>Est. Cost.</i>
Sparta and Newton (second section).....	1.00	\$7,500 00
Sussex and Newton (second section).....	1.00	7,500 00
Monroe Corner and Franklin	2.00	8,535 00
Newton and Andover	2.00	8,885 00
Tuttle's Corner and Hainesville .....	.50	2,580 00
Stanhope and Andover	1.00	5,215 00
Port Jervis	1.00	5,285 00
Vernon	2.00	9,000 00
	10.50	\$54,500 00

UNION COUNTY.

Cranford and Mountainside	5.75	30,000 00
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WARREN COUNTY.

Belvidere and Phillipsburg	3.01	\$16,500 00
Total number of miles		170.91
Total estimated cost		\$953,080 00

During the years 1893 and 1894 there were built in

Middlesex county	16.09 miles.
Mercer county	12.78 "
Camden county	14.50 "
Burlington county	31.47 "
Total number of miles built in 1893 and 1894.....	74.84

During the year 1895 there were built in

Burlington county	9.75 miles.
Camden county	8.25 "
Esssex county	6.50 "
Gloucester county	7.75 "
Middlesex county	7.62 "
Mercer county	6.40 "
Total number of miles built in 1895.....	46.27

COMMISSIONER OF PUBLIC ROADS.

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During the year 1896 there were built in

Atlantic county	12.00	miles.
Burlington county	11.01	"
Essex county	6.00	"
Gloucester county	6.00	"
Mercer county	10.95	"
Middlesex county	9.00	"
Monmouth county	3.75	"
Salem county	2.67	"
	<hr/>	
Total number of miles built in 1896.....	61.38	

During the year 1897 there were built in

Atlantic county	10.50	miles.
Burlington county	10.00	"
Camden county	4.12	"
Essex county	5.00	"
Gloucester county	5.50	"
Mercer county	4.75	"
Middlesex county	4.75	"
Morris county	6.12	"
Monmouth county	5.00	"
Passaic county	4.75	"
Somerset county	6.20	"
	<hr/>	
Total number of miles built in 1897.....	66.69	

During the year 1898 there were built in

Atlantic county	6.80	miles.
Burlington county	14.91	"
Camden county	12.80	"
Essex county	9.60	"
Gloucester county	7.60	"
Mercer county	2.70	"
Middlesex county	6.17	"
Monmouth county	5.11	"
Morris county	6.10	"
Passaic county	5.88	"
Somerset county	7.25	"
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Total number of miles built in 1898.....	84.92	

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During the year 1899 there were built in

Atlantic county	3.82	miles.
Burlington county	18.50	"
Camden county	2.20	"
Essex county	12.02	"
Gloucester county	12.80	"
Mercer county	10.92	"
Middlesex county	13.87	"
Monmouth county	15.06	"
Morris county	8.00	"
Passaic county	8.67	"
Salem county	2.17	"
Somerset county	6.60	"
Warren county .....	.09	"

Total number of miles built in 1899..... 114.72

During the year 1900 there were built in

Burlington county	8.93	miles.
Camden county	1.00	"
Essex county	9.60	"
Gloucester county	9.08	"
Hudson county	2.44	"
Mercer county	9.16	"
Middlesex county	9.01	"
Monmouth county	8.28	"
Morris county	6.53	"
Passaic county	6.73	"
Salem county	2.45	"
Somerset county	6.65	"
Union county	3.43	"

Total number of miles built in 1900..... 83.29

During the year 1901 there were built in

Atlantic county	7.03	miles.
Burlington county	17.36	"
Camden county	4.48	"
Cape May county	6.00	"
Essex county	9.36	"
Gloucester county	17.44	"
Mercer county	10.37	"
Middlesex county	6.12	"
Monmouth county	6.67	"
Morris county	4.306	"
Passaic county	3.987	"
Somerset county	7.93	"
Sussex county893	"
Warren county	7.43	"

Total number of miles built in 1901..... 109.376

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During the year 1902 there were built in

Atlantic county	20.10 miles.
Bergen county	1.02 "
Burlington county	19.131 "
Camden county	8.80 "
Cape May county	5.394 "
Essex county	8.723 "
Gloucester county	6.875 "
Mercer county	15.89 "
Middlesex county	14.95 "
Monmouth county	13.25 "
Morris county	10.639 "
Ocean county	3.90 "
Passaic county	6.57 "
Salem county	3.25 "
Somerset county	5.88 "
Union county	2.141 "
Warren county	8.792 "
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Total number of miles built in 1902.....	155.305

During the year 1903 there were built in

Atlantic county	13.00 miles.
Burlington county	27.98 "
Camden county	9.50 "
Cape May county	6.20 "
Cumberland county	1.22 "
Essex county	5.79 "
Gloucester county	7.73 "
Mercer county	12.30 "
Middlesex county	9.52 "
Monmouth county	20.04 "
Morris county	7.13 "
Ocean county	9.97 "
Passaic county	6.09 "
Salem county	4.61 "
Somerset county	6.24 "
Sussex county	4.03 "
Warren county	3.94 "
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Total number of miles built in 1903.....	155.29 "

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Names and lengths of the roads built in 1903:

ATLANTIC COUNTY.

	<i>Miles.</i>	
Absecon and Chestnut Neck.....	11.00	
Pleasantville and Atlantic City.....	2.00	
		----- 13.00

BURLINGTON COUNTY.

Chesterfield	2.81	
Crosswicks and Bordentown.....	3.19	
Vincentown and Red Lion.....	1.61	
Moorestown and Masonville.....	3.76	
New Gretna	8.15	
Beverly and Burlington.....	2.16	
Piper's Corner and Indian Mills.....	4.00	
Burlington and Columbus (second section).....	2.30	
		----- 27.98

CAMDEN COUNTY.

Haddonfield and Mount Ephraim (second section).....	1.44	
Stoy's Landing .....	.67	
Camden and Blackwood Turnpike.....	7.39	
		----- 9.50

CAPE MAY COUNTY.

Seashore	3.86	
Rio Grande and Holly Beach.....	2.34	
		----- 6.20

CUMBERLAND COUNTY.

Mauricetown Bridge	1.22	
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ESSEX COUNTY.

Dutch lane	2.59	
Grove street	2.07	
Ridgewood avenue	1.13	
		----- 5.79

GLOUCESTER COUNTY.

Main street, Williamstown.....	1.77	
Clayton and Williamstown.....	5.96	
		----- 7.73

COMMISSIONER OF PUBLIC ROADS.

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MERCER COUNTY.

	<i>Miles.</i>	
River	5.95	
Marshall's Corner and Woodsville.....	2.43	
Centerville	1.97	
Shabakunk	1.95	
	<hr/>	12.30

MIDDLESEX COUNTY.

Oak Tree and Iselin.....	1.25	
New Durham	1.00	
Plainsboro and Aqueduct.....	1.52	
Red Tavern or Applegarth.....	1.00	
New Brunswick and Bound Brook.....	2.50	
Sayreville and South Amboy.....	2.25	
	<hr/>	9.52

MONMOUTH COUNTY.

Corliss avenue	4.47	
Second, John, Church and Front streets, Keyport.....	.78	
Manalapan and Freehold (first section).....	2.92	
Manasquan River and Belmar.....	6.29	
Ocean avenue, North Long Branch.....	1.76	
Extension of Navesink.....	2.32	
Main street, Matawan.....	1.50	
	<hr/>	20.04

MORRIS COUNTY.

Green Village	3.40	
Newark and Pompton turnpike.....	.75	
Sussex and Newton turnpike.....	1.07	
Lincoln Park, Montville and Boonton (first section).....	1.34	
Mount Freedom or Newton turnpike.....	.57	
	<hr/>	7.13

OCEAN COUNTY.

Little Egg Harbor Shore (first section).....	2.04	
Little Egg Harbor Shore (second section).....	1.25	
Little Egg Harbor Shore (third section)	2.11	
Sea avenue .....	.87	
Lakewood (first section).....	3.70	
	<hr/>	9.97

PASSAIC COUNTY.

East Thirty-first street.....	1.00	
Squaw Brook	1.46	
Macopin	2.75	
Clove88	
	<hr/>	6.09

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SALEM COUNTY.

	<i>Miles.</i>	
Elmer and Alloway.....	3.87	
Salem and Hancock's Bridge.....	.74	
	<hr/>	4.61

SOMERSET COUNTY.

Neshanic	6.24
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SUSSEX COUNTY.

Sussex and Newton.....	1.50	
Stanhope and Newton.....	1.53	
Sparta and Newton.....	1.00	
	<hr/>	4.03

WARREN COUNTY.

Danville (first section).....	1.20	
Stewartsville (first section).....	1.28	
Straw Church	1.46	
	<hr/>	3.94
		<hr/>
		155.29

The total amount expended by the State and the number of miles paid for in each county since the passage of the State Aid law are as follows:

<i>County.</i>	<i>Miles.</i>	<i>Amount.</i>
Atlantic	73.25	\$50,287 20
Bergen	1.02	1,315 31
Burlington	169.04	252,283 77
Camden	65.65	119,401 47
Cape May	17.60	22,568 20
Cumberland	1.22	7,156 54
Essex	72.59	155,747 64
Gloucester	80.78	85,128 27
Hudson	2.44	8,944 60
Mercer	96.22	230,923 60
Middlesex	97.10	161,561 95
Monmouth	77.16	114,209 75
Morris	48.82	92,852 54
Ocean	13.87	15,465 83
Passaic	42.68	59,060 80
Salem	15.15	13,753 18
Somerset	46.75	72,769 84
Sussex	4.92	8,179 64
Union	5.57	7,689 51
Warren	20.25	35,868 91
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	952.08	\$1,515,168 55

COMMISSIONER OF PUBLIC ROADS.

AMOUNT AVAILABLE FOR ROAD BUILDING IN EACH COUNTY.

Under the State Aid law, the estimated cost of all improvements made under this act, together with the estimated cost of repairs of roads already constructed, in any county in any one year, shall not exceed one-half of one per centum of the ratables of such county for the last preceding year.

The following table will show at a glance the limitations of expenditures in each county, also the amount that can be expended, provided the State appropriation is liberal enough to meet it. For example: Atlantic county, with ratables amounting to \$53,456,611, could expend per year, if State appropriation were sufficient, \$267,283.05; a rate, if applied to all the counties, even with the cost of repairs to roads already built deducted, would, in a few years, cover all our leading roads with stone and gravel:

<i>County.</i>	<i>Abstract of Ratables for 1903.</i>	<i>One-half of one per cent.</i>
Atlantic	\$53,456,611 00	\$267,283 05
Bergen	44,185,940 00	220,929 70
Burlington	22,255,723 00	111,278 62
Camden	46,672,767 00	233,363 83
Cape May	8,818,000 00	44,090 00
Cumberland	17,574,000 00	87,870 00
Essex	237,172,475 00	1,185,862 38
Gloucester	15,074,924 00	75,374 62
Hudson	186,039,900 70	930,199 50
Hunterdon	17,727,895 00	88,639 47
Mercer	49,228,664 00	246,143 32
Middlesex	32,908,792 00	164,543 96
Monmouth	51,020,169 00	255,100 85
Morris	29,207,723 00	146,038 61
Ocean	9,551,646 00	47,758 23
Passaic	73,798,023 00	368,990 12
Salem	13,979,520 00	69,897 60
Somerset	18,962,037 00	94,810 18
Sussex	14,859,294 00	74,296 47
Union	47,106,200 00	235,531 00
Warren	18,462,309 00	92,311 55

The following roads have been and are being petitioned for, to be improved under the State Aid act:

ATLANTIC COUNTY.

	<i>Miles.</i>	<i>Est Cost.</i>
May's Landing and Tuckahoe—gravel.....	11.00	\$22,000 00
May's Landing and Downstown—gravel.....	14.00	28,000 00
Hammonton and Atsion—gravel.....	8.00	24,000 00
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	33.00	\$74,000 00

TENTH ANNUAL REPORT.

BURLINGTON COUNTY.

	<i>Miles.</i>	<i>Est. Cost.</i>
Pemberton and Vincentown—stone.....	5.00	\$30,000 00
Pemberton and Turpentine—stone.....	6.00	36,000 00
Masonville and Coates' Corner—stone.....	3.50	21,000 00
Cross Road and Green Tree—stone.....	2.50	15,000 00
Green Tree Pike—stone.....	2.00	12,000 00
Red Lion and Tabernacle—gravel.....	4.00	12,000 00
Indian Mills, Atsion and Batsto—gravel.....	9.50	19,000 00
Pemberton and Wrightstown—stone.....	6.00	36,000 00
Burlington and Jacksonville—stone.....	6.00	36,000 00
Rancocas and Burlington—stone.....	4.00	24,000 00
Rancocas and Beverly—stone.....	5.00	30,000 00
Recklesstown and Mansfield—stone.....	1.60	9,000 00
Ward avenue, Crosswicks—stone.....	3.50	21,000 00
Medford and Wilkins streets—stone.....	1.50	9,000 00
Wrightstown and Rising Sun—stone.....	7.00	42,000 00
Keeler's Corner and Jacksonville—stone.....	2.00	12,000 00
Hartford and Bridgeboro—stone.....	3.30	18,000 00
Bordentown and Groveville—stone.....	3.00	18,000 00
Auback and Groveville bridge—stone.....	2.00	12,000 00
Georgetown and Wrightstown—gravel.....	4.00	8,000 00
Bordentown and Florence—stone.....	5.00	30,000 00
Florence station to Burlington city line—stone.....	4.00	24,000 00
Mount Laurel and Hainesport—stone.....	7.00	42,000 00
Ballenger's Mills and Tabernacle—gravel.....	4.00	8,000 00
Tabernacle and Chatsworth—gravel.....	10.50	21,000 00
New Egypt and Chatsworth—gravel.....	12.00	24,000 00
Mount Holly and Rancocas—stone.....	4.00	24,000 00
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	126.90	\$593,000 00

CAMDEN COUNTY.

Haddonfield and Gibbsboro—stone.....	4.00	\$24,000 00
Berlin and Milford—gravel.....	5.00	10,000 00
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	9.00	\$34,000 00

CUMBERLAND COUNTY.

Bridgeton and Roadstown—gravel.....	5.00	\$10,000 00
Fortescue—gravel.....	2.00	10,000 00
Mellick and Millville—gravel.....	6.00	12,000 00
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	13.00	\$32,000 00

ESSEX COUNTY.

West Livingston and Northfield Church—stone.....	1.34	\$11,500 00
Fifth avenue, Verona—stone.....	1.00	7,500 00
Wall street and Stuyvesant avenue, Vailsburg—stone..	3.00	24,000 00
Newark Plank road—stone.....	.47	15,000 00
Mount Pleasant avenue—stone.....	1.12	9,000 00
Northfield and Morehousetown—stone.....	1.75	14,000 00
South Orange avenue to Passaic river—stone.....	1.13	9,500 00
Pier lane, Caldwell—stone.....	1.00	8,000 00
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	10.81	\$98,500 00

COMMISSIONER OF PUBLIC ROADS.

GLOUCESTER COUNTY.

	<i>Miles.</i>	<i>Est. Cost.</i>
Glassboro and Mullica Hill—gravel.....	6.50	\$13,000 00
Mullica Hill and Salem county line—gravel.....	5.00	10,000 00
Chapman's Mill road, Mullica Hill to Swedesboro— gravel	4.50	9,000 00
Jefferson and Paulsboro—gravel.....	5.50	11,000 00
Glassboro and Bridgeton—gravel.....	6.50	13,000 00
Auburn road, Swedesboro to Auburn—stone.....	3.50	17,500 00
Almonesson and Westville—stone.....	4.00	20,000 00
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	35.50	\$93,500 00

HUDSON COUNTY.

Newark Plank road—stone.....	1.32	\$35,000 00
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HUNTERDON COUNTY.

Middle Valley to Morris county line—stone.....	2.50	\$10,000 00
Rockaway Valley and New Germantown—stone.....	1.50	6,000 00
Lambertville and Ringoes—stone.....	3.00	15,000 00
Woodsville and Ringoes—stone.....	4.00	20,000 00
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	11.00	\$51,000 00

MERCER COUNTY.

Trenton and New Brunswick turnpike—stone.....	8.80	\$52,800 00
Hamilton Square and White Horse—stone.....	3.70	22,200 00
Trenton and Princeton turnpike—stone.....	8.30	49,800 00
Whitehead's Mill—stone	1.00	6,000 00
Olden avenue—stone	2.30	13,800 00
Liberty street—stone	1.20	7,200 00
Vankirk—stone	5.00	30,000 00
Mercerville and Lawrence Station—stone.....	3.20	19,200 00
Yardville and Allentown turnpike—stone.....	3.40	20,400 00
Grover's Mills—stone	1.90	11,400 00
Windsor and Sharon—stone.....	3.00	18,000 00
Pennington and Washington's Crossing—stone.....	5.00	30,000 00
Extension Trenton and Allentown turnpike—stone...	3.20	19,200 00
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	50.00	\$300,000 00

MIDDLESEX COUNTY.

Woodbridge and Iselin—stone.....	2.50	\$20,000 00
Highland Park and Bonamtown—stone.....	3.00	18,000 00
Milltown and Spotswood—stone.....	4.00	24,000 00
Clifton and Ryder's lane—stone.....	3.00	18,000 00
Woodbridge and Oak Tree—stone.....	4.10	24,000 00
Rahway and Woodbridge—stone.....	4.00	24,000 00
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	20.60	\$128,000 00

TENTH ANNUAL REPORT.

MONMOUTH COUNTY.

	<i>Miles.</i>	<i>Est. Cost.</i>
Amboy and Keyport—stone.....	2.00	\$12,000 00
Middlesex and Red Bank—stone.....	3.85	19,140 00
Red Valley and Allentown—stone.....	6.25	36,343 00
Blue Ball and Freehold—gravel.....	3.00	6,000 00
Englishtown and Freehold—gravel.....	5.03	17,449 00
Sweetman's lane and Black's Mills—gravel.....	2.95	4,500 00
	23.08	\$95,432 00

MORRIS COUNTY.

Long Hill and Gillette—stone.....	2.00	\$12,000 00
Chester to Delaware, Lackawanna and Western rail- road—stone .....	.96	4,915 00
New Vernon (Sand Springs)—stone.....	2.00	12,000 00
Whippany and Swinefield bridge—stone.....	5 00	30,000 00
Beavertown Plain and Boonton—stone.....	4.28	24,000 00
Pompton and Pequannock river—stone.....	4.30	24,000 00
Passaic and Mountain View—stone.....	2.60	15,000 00
Morristown and Speedwell Lake—stone.....	2.00	12,000 00
Lower Mine Hill—stone.....	1.66	9,000 00
Denville and Boonton—stone.....	4.54	27,000 00
Troy Hills and Whippany—stone.....	3.34	20,000 00
	32.68	\$189,915 00

OCEAN COUNTY.

Long Beach—gravel.....	15.00	\$30,000 00
Seaside Park—gravel.....	12.00	24,000 00
	27.00	\$54,000 00

PASSAIC COUNTY.

Lackawanna avenue—stone	2.00	\$10,000 00
Morton House and Bergen county line—stone.....	2.00	10,000 00
Midvale and Greenwood Lake—stone.....	10.00	50,000 00
Goffle Still—stone	1.42	6,000 00
Briggs avenue—stone	1.32	5,500 00
Oldhan—stone	1.00	4,500 00
Lafayette avenue—stone .....	.56	2 300 00
Green—stone	1.30	5,500 00
East Thirtieth street—stone.....	.50	2,100 00
Randolph avenue—stone .....	.94	4,000 00
	21.04	\$99,900 00

SALEM COUNTY.

Salem and Pennsville—stone.....	6.00	\$36,000 00
Salem and Woodstown—shell.....	4.00	12,000 00
	10.00	\$48,000 00

COMMISSIONER OF PUBLIC ROADS.

SOMERSET COUNTY.

	<i>Miles.</i>	<i>Est. Cost.</i>
Union avenue, Somerville to Raritan—stone.....	2.16	\$11,000 00
Franklin Park and Kingston—stone (one-half mileage and cost)	2.50	15,000 00
Plainfield and Morristown—stone.....	2.50	15,000 00
Dead River and Liberty Corner—stone.....	3.00	15,000 00
Rocky Hill and Kingston—stone.....	1.10	7,000 00
Stoutsburg and Plainville—stone.....	4.50	26,000 00
Basking Ridge and Van Doren's Mills—stone.....	2.33	12,000 00
Somerville and Wagner's Corner—stone.....	1.00	5,000 00
Franklin Park and Middlebush—stone.....	5.00	25,000 00
Labaw's Corner and Princeton—stone.....	4.06	20,000 00
Union avenue and Blackwell's Mill, Findern—stone,	6.50	33,000 00
Pleasant View Schoolhouse and Millstone—stone....	4.75	24,000 00
Millstone and Wood's Tavern—stone.....	3.25	16,000 00
Bedminster and Lamington—stone.....	4.50	23,000 00
Far Hills and Liberty Corner—stone.....	4.00	22,000 00
	51.15	\$269,000 00

Total number of miles petitioned for in all the counties..... 475.98
 Total estimated cost of all the roads petitioned for..... \$2,195,247 00

Description of Roads Improved in 1903.

ATLANTIC COUNTY.

Absecon and Chestnut Neck Road, 11 Miles Long.

This road begins at the easterly edge of the new bridge at Absecon and extends northerly through Oceanville, Smithville and Port Republic to the southerly end of the new county road across the meadows at Chestnut Neck. It is constructed of gravel, fourteen feet wide, six and eight inches thick.

This road follows the bay shore to Oceanville; thence bearing north, it extends through a large pine forest, the only openings in which are the clearings made by the residents along the line of the road, some of whom are small farmers, engaged in raising fruit and vegetables for the Atlantic City market, while others are fishermen and deep-sea sailors. The road is a portion of a continuous line which is being built along the shore from Atlantic City through the counties of Atlantic, Burlington, Ocean and Monmouth. It is already largely traveled by automobilists and other pleasure seekers from New York and the upper coast towns. In addition to this it also has a commercial value, in that it affords an outlet for the salt hay and products of the bay to the great and constantly-growing markets of Atlantic City.

John Hanselman, Cologne, New Jersey, was the contractor.

The maximum grade was reduced from 5.60 per cent. to 3.93 per cent.

The price per cubic yard for compacted gravel was 28 cents.

The total cost was \$18,985.56.

Pleasantville and Atlantic City Road, 3.58 Miles Long.

This road begins at the borough of Pleasantville and extends to Atlantic City. It is constructed of gravel, sixty feet wide and six inches thick.

This is a boulevard built across the meadows from the mainland to New Jersey's most famous seaside resort, Atlantic City. By means of this improvement the thousands of people that throng the sands of the seashore may reach the mainland and its many miles of finely-graveled roads which have been constructed during the past few years by the State and county, thereby giving Atlantic City something that it had long lacked, namely, quick and easy access to good roads for pleasure driving and automobiling. Leaving Atlantic City at Chelsea and passing through Chelsea Heights, the road crosses the meadows to Pleasantville.

John B. Hess and William H. Le Chard, Atlantic City, New Jersey, were the contractors.

This road is practically level.

The price per cubic yard for compacted gravel was \$1.

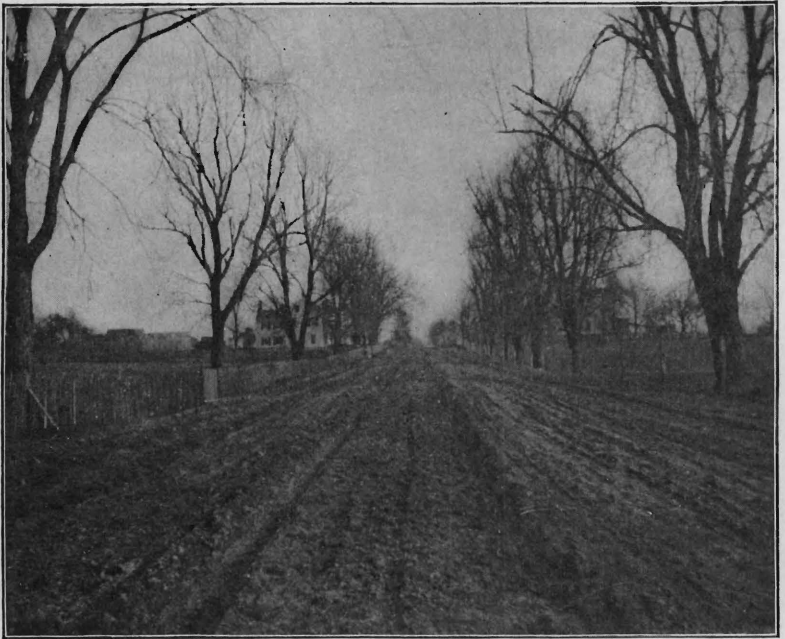
The total cost to date is \$33,859.47.

BURLINGTON COUNTY.

Crosswicks and Bordentown Road, 3.19 Miles Long.

This road begins at the city line, at the intersection of the center line of Thornton road and the turnpike, and extends to the intersection of Bridge avenue and Main street, in the village of Crosswicks. It is constructed of macadam, twelve feet wide and six inches thick. It passes over a sandy and clay loam soil.

This road will enable the people of Crosswicks and the surrounding county to easily cart their productions to the markets of Bordentown and Trenton. Connecting, as it does, the region about Crosswicks with the roads radiating from Bordentown, it brings this region in much closer touch with the larger cities and towns along the Delaware river.



Bordentown and Crosswicks turnpike, Burlington Co., before completion.



Looking toward Crosswicks on Bordentown and Crosswicks turnpike, Burlington Co., after completion.

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The Delaware River Quarry and Construction Company, Jersey City, New Jersey, was the contractor.

The maximum grade was reduced from 3 per cent. to 2.7 per cent.

The price per contract, lump sum, was \$19,804.15.

The total cost was \$20,445.28.

Chesterfield Road, 2.81 Miles Long.

This road begins at the Crosswicks and Bordentown turnpike and extends to the village of Chesterfield. It is constructed of macadam, twelve feet wide and six inches thick.

This road passes through a beautiful farming country. When extended to Jacobstown and New Egypt it will open out one of the richest farming sections in the State.

This section has long been suffering for the want of hard roads over which the farmers could travel to the markets of Trenton and Bordentown. By means of the improvement they have received a good road that they have long wished for.

The Delaware River Quarry and Construction Company, Jersey City, New Jersey, was the contractor.

The maximum grade was reduced from 2.4 per cent. to 2.1 per cent.

The price per contract, lump sum, was \$17,393.54.

The total cost was \$17,684.19.

Vincentown and Red Lion Road, 3.50 Miles Long.

This road begins at Vincentown and extends to Red Lion. It is constructed of macadam, twelve feet wide and six inches thick. It is built over a black sand and alluvial soil. It connects a thriving farming section with Vincentown, a trading center and railroad terminus. Immense quantities of marl are carted over this road into the Shamong district, for the purpose of maintaining the fertility of the soil of a large farming section which lies a few miles beyond.

This road will prove of incalculable benefit to the farmers and others residing along and contiguous to its course, affording them

easy access at all seasons of the year to the shipping station at Vincenttown.

J. Roosevelt Shanley, Jersey City, New Jersey, was the contractor.

The maximum grade was reduced from 5 per cent. to 2 per cent.

The price per contract, lump sum, was \$24,334.

The total cost was \$25,224.

Moorestown and Masonville Road, 3.76 Miles Long.

This road begins at the northerly terminus of the Mount Laurel road, in the township of Chester, and extends in an easterly direction to the town of Masonville. It is constructed of macadam, twelve and sixteen feet wide and six and eight inches thick. The completion of this road gives the traveling public a continuous improved highway from Camden to Mount Holly. It traverses a fine farming section, and, as it forms a portion of the direct route between Mount Holly and Camden, both the trolley and steam roads practically parallel it. This road was an old turnpike which has only recently been deserted. It would have been improved long ago had it not been for the dilatoriness on the part of the turnpike company in surrendering its charter. This is one of several links we are closing to make long, continuous lines of improved roads.

J. R. Shanley, Jersey City, New Jersey, was the contractor.

The maximum grade was reduced from 3 per cent to 2.4 per cent., except where the road passes beneath the trolley.

The price per contract, lump sum, was \$26,452.31.

The total cost was \$27,494.17.

New Gretna Road, 8.15 Miles Long.

This road begins at the Wading river bridge and extends through New Gretna to the Ocean county line. It is constructed of gravel, fourteen feet wide and from four to eight inches thick. It is built over sand and sandy loam soil, through swamps interspersed with stretches of moderately-fertile farming land. It



New Gretna road, Burlington Co., before improvement.



New Gretna road, Burlington Co., after improvement.

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forms the last section in Burlington county of the through route from Atlantic City to Lakewood, connecting with the completed portion in Atlantic county on the south and with the sections built and about to be built in Ocean county on the north. In addition to forming a portion of the through line referred to, this road forms a good and convenient means of communication between several important trading towns situated at the head of navigation on the Mullica river and its branches.

This road was built in two sections, the first commencing at Wading river and extending through New Gretna to the bridge over Bass river, a distance of 5.29 miles, in 1902; the second, or 2.83 miles, from Bass river bridge to the Ocean county line, in 1903.

Aaron M. Mathis, New Gretna, New Jersey, was the contractor. The road was and is practically level.

The price per cubic yard for compacted gravel was 26 cents. The total cost was \$7,441.18.

Beverly and Burlington Road, 2.16 Miles Long.

This road begins at the easterly city line of Beverly and extends to the stone-constructed road from Burlington to Bridgeboro. It is constructed of macadam, fourteen feet wide and six inches thick.

This road completes the through line between Trenton and Camden, passing through the many thriving river towns, thus giving them an outlet to the markets at either end. The construction of this highway enables the tourist to travel from Jersey City via Trenton to Atlantic City, over an unbroken line of improved roads.

J. R. Shanley, Jersey City, New Jersey, was the contractor.

The maximum grade was 1 per cent., which was increased to 5 per cent., to avoid a grade crossing.

The price per contract, lump sum, was \$15,691.62.

The total cost was \$15,691.62.

Piper's Corner and Indian Mills Road, 4 Miles Long.

This road begins at Piper's corner, township of Medford, and extends to Stokes road, Shamong township, via Indian Mills. It is constructed of gravel, ten feet wide, six and eight inches thick. It is a part of the Stokes road built last year. It extends through a very good section of country, opening to the outside markets several thousand acres of fertile land around Indian Mills. The continuation of this road this year will enable the large amount of produce which is annually raised in this section, to find an easy passage to profitable markets. We hope to continue the road still farther until it will connect with the seashore settlements.

John Thomson, Avon, New Jersey, was the contractor.

The maximum grade was reduced from 4 per cent. to 3.50 per cent.

The price per cubic yard for compacted gravel was 30 cents.

The total cost was \$6,377.03.

*Burlington and Columbus Road, 7 Miles Long, 4.70 Miles of
Which Were Paid for Last Year, and the Remainder
or 2.30 Miles This Year.*

This road begins at the crown of the railroad arch in the village of Columbus and extends to the bridge over Assiscunk creek, Burlington. It is constructed of macadam, fourteen feet wide and six inches thick. For the most of its course it traverses a fine agricultural country, over a sandy and sandy loam soil. Along and tributary to the road are many fine farms that have been productive for nearly two centuries. This road renders it easy for the tenants of these farms to carry their productions to the markets of Burlington, and over the connecting stone roads through the thriving river villages to the Camden and Philadelphia markets. At its eastern end this road connects with the Columbus, Bordentown and Trenton road, which enables the farmers to carry their products to the manufacturing city of Trenton. It also forms a connection between the improved road passing through Columbus and the improved roads leading from



⌘| Columbus and Burlington road, Burlington Co., before improvement.



Columbus and Burlington road, Burlington Co., after improvement.

COMMISSIONER OF PUBLIC ROADS.

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Burlington to Camden, giving a direct course by way of Burlington for vehicles of all kinds to Camden and Philadelphia, and virtually opening up another through line across the State.

J. Roosevelt Shanley, New York City, was the contractor.

The maximum grade was reduced from 6 per cent. to 4 per cent.

The price per contract, lump sum, was \$34,900.

The total cost was \$36,648.61; the remainder due, or \$11,-061.05, was paid this year.

CAMDEN COUNTY.

Camden and Blackwood Turnpike, 7.39 Miles Long.

This road begins at Ferry avenue, in the city of Camden, and extends to Wentz's hotel, in Blackwood. It is built of gravel, but will probably be resurfaced with stone in the course of one or two years. It has long been a toll road, but was bought this year from the stockholders and thrown open for free public use. This old turnpike was built through a highly-improved farming section, the inhabitants of which were and are largely engaged in raising early fruits and vegetables for the Camden and Philadelphia markets. Perhaps more truck is raised on the lands tributary to this road than along any other in the State.

The purchase price was \$10,000.

Haddonfield and Mt. Ephraim Road, 1.44 Miles Long.

This is the completion of a road commenced in 1900, which extends from the main street of Haddonfield to the stone road in Mt. Ephraim. It is built of madacam, fifteen feet wide and eight inches deep.

This road is built through a very pretty residential section and over a fine farming country. It affords the residents of Haddonfield a pleasant means of reaching the White Horse road, that great thoroughfare which leads from Camden to Atlantic City.

J. R. Shanley, Jersey City, New Jersey, was the contractor.

The maximum grade was reduced from 7.05 per cent. to 3.95 per cent.

The cost per contract, lump sum, was \$12,500.

The total cost was \$13,426.92.

Remainder of Stoy's Landing Road, .67 Miles Long.

This road, which begins at Haddonfield and extends to Marlton pike, was partially completed in 1902, but was not entirely finished until 1903. It is built of macadam, twelve feet wide and eight inches thick. In connection with the Marlton and Camden pike, it affords another outlet to the thriving towns north. Many quicksand bottoms were encountered in the cuts. Over these a telford foundation was constructed. By this means a very bad road was converted into a very good one. As it also connects Haddonfield with the improved roads running north and east to Marlton, Medford and Moorestown, it has promoted to a very great extent the comfort, convenience and general welfare of the inhabitants of the good agricultural district through which it is built.

J. R. Shanley, New York City, was the contractor.

The maximum grade was reduced from 6.20 per cent. to 3.40 per cent.

The total cost of .67 of a mile, completed this year, was \$4,504.11.

CAPE MAY COUNTY.

Rio Grande and Holly Beach Road, 2.34 Miles Long.

This road begins at the easterly side of the Main Shore road, opposite Somers Isard's house, and extends to the westerly side of Grassy Sound channel. It is built of gravel, fourteen feet wide and eight inches thick.

The construction of this road varies from that of the ordinary gravel road on upland, inasmuch as the meadows furnish a very unstable foundation; therefore, the foundation was constructed of poles laid on stringers; these in turn were covered with upland soil; over the soil a layer of oyster shells was spread, and the entire road finished with Buck Hill gravel. To retain this material

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and prevent its being washed away by high tides, bulkheads were built and planks placed on edge, and in less exposed portions the sides of the embankment were covered with meadow sod. Over the thoroughfares bridges were constructed.

Since its completion this road has more than equaled the expectations of its designers by the manner with which it has withstood the unusually heavy tides without damage.

It affords a very good outlet to the mainland for the inhabitants of the rapidly-growing seaside resorts of Holly Beach, Wildwood and Anglesea.

Robert E. Hand, Erma, New Jersey, was the contractor.

The road was, and is, practically level.

The price per contract, lump sum, was \$14,500.

The total cost was \$15,904.27.

Seashore Road, 12.17 Miles Long, All of Which Was Paid for Except 3.86 Miles, Which Was Paid for This Year.

This road begins at Crook's creek bridge, in Middle township, and extends to Cape Island turnpike. It is built of gravel, fourteen feet wide, six to eight inches thick. The gravel, which is of a very fine quality, was obtained from the Moore gravel pits, near Tuckahoe.

This road makes a through line from Cape May City to Cape May Court House. The country through which it passes is level, flat farming land, composed of a sandy loam soil, sand predominating.

Fine drives are a much-needed acquisition to Cape May, and this one gives the inhabitants and the numerous summer visitors a fine boulevard upon which to exercise their steeds, and likewise an outlet for the produce of many truck farmers living along and contiguous to its line to the markets of Cape May City.

B. F. Sweeten & Son, Camden, New Jersey, were the contractors.

The road was, and is, practically level.

The total cost of 3.86 miles was \$12,601.58.

CUMBERLAND COUNTY.

Mauricetown Bridge Road, 1.22 Miles Long.

This road begins at the center of Port Elizabeth and Dorchester road, and extends to the east end of the Mauricetown bridge. It is built of gravel, fourteen and twenty feet wide and twelve inches thick.

This road extends across the Maurice river meadows to the Mauricetown bridge, at the edge of Mauricetown. It makes a short and direct route for the inhabitants of Mauricetown from their village to the Pennsylvania railroad station. Before its construction the people had to travel several miles around the meadows to reach the station.

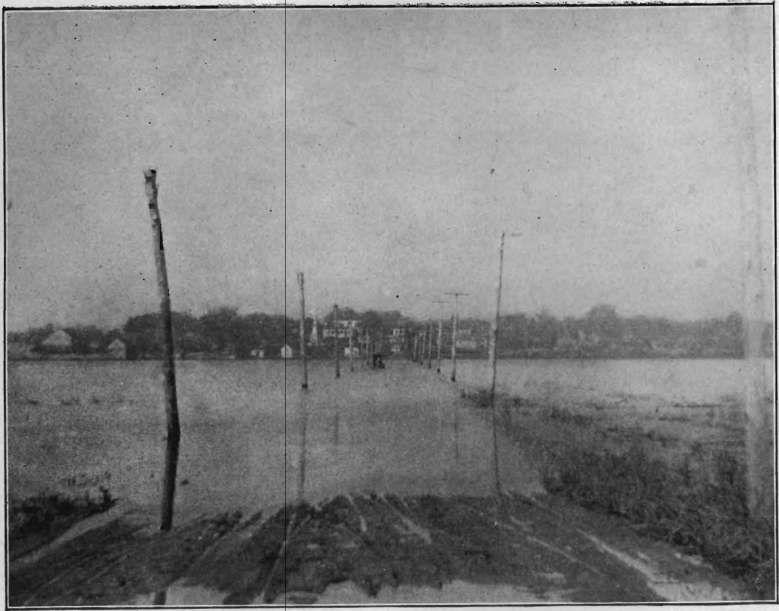
This was a very costly road to build, owing to the fact that these meadows were overflowed at high tide; therefore, it was necessary to build an embankment high enough to place the road beyond the reach of the inflowing water, and for this purpose it was necessary to use 64,000 cubic yards of earth and gravel. The railroad company very generously furnished the track, cars and sand without cost. Had it not been for this action on the part of the company, the cost of the road would have been almost prohibitive. To-day we have an embankment from seven to ten feet in height and from forty-eight to sixty feet in width at the base, finished with a gravel surface varying in width from fourteen to twenty feet, over which the inhabitants of Mauricetown may travel with ease and comfort at all seasons of the year.

Alfred H. Lupton, Bridgeton, New Jersey, was the contractor. The maximum grade was reduced from 3 per cent. to 1 per cent. The cost was \$21,469.62.

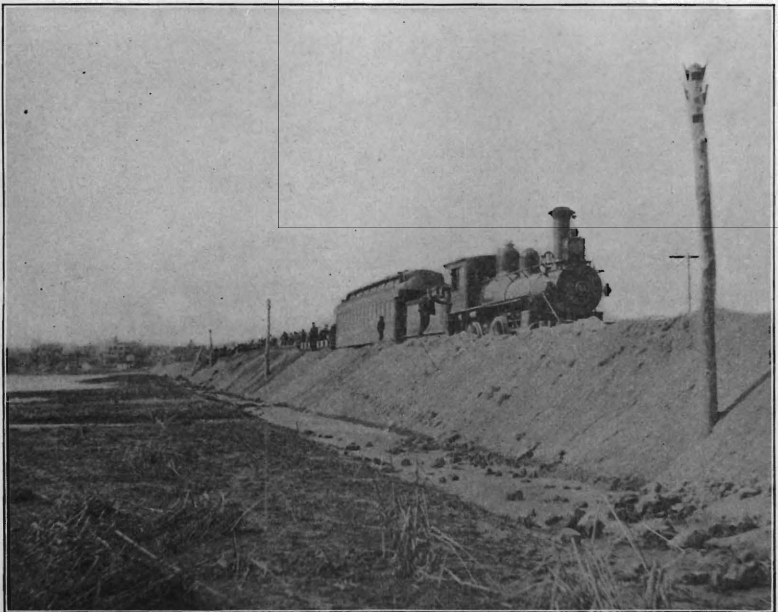
ESSEX COUNTY.

Dutch Lane, 2.59 Miles Long.

This road begins at Blomfield avenue, Franklin, a suburb of Caldwell, and winds northwardly between fertile hills and over the rich alluvial soil of Long meadow to the Fairfield stone road.



Mauricetown Bridge road, Cumberland Co., looking east ; high water.



Mauricetown Bridge road, Cumberland Co., under construction ; fill across marshes.

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It is constructed of telford, sixteen feet wide and eight inches thick.

This road forms a means of ingress and egress to the rich meadow lands on which hundreds of cattle daily feed, and passes in its course the famous Fairfield dairy, of the Francisco Brothers. This dairy alone ships over four thousand quarts of milk per day, all of which must be transported over this road.

James H. & Sherman G. Francisco, Little Falls, New Jersey, were the contractors.

The maximum grade was reduced from 7.26 per cent. to 3.68 per cent.

The total cost was \$16,881.35.

Grove Street, 2.07 Miles Long.

This road begins at Central avenue, in East Orange, and extends southerly to Clinton avenue, Irvington. It is constructed of telford, sixteen feet wide and eight inches thick.

The improvement of this road completes the good-road system of eastern Essex, and forms a connecting link between the Oranges, Vailsburg and Irvington, giving the residents of Newark and the Oranges another outlet to the improved roads of Morris county.

George Spottiswoode, Thomas M. Cusack and George E. Spottiswoode, Orange, New Jersey, were the contractors.

The maximum grade was and is 2 per cent.

The total cost was \$18,255.19.

Ridgewood Avenue, 1.13 Miles Long.

This road begins at Bay avenue and extends to Watchung avenue, in the borough of Glen Ridge. It is constructed of telford, sixteen feet wide and eight inches thick.

This road, or street, passes through the borough of Glen Ridge, and gives the inhabitants thereof an outlet to Bloomfield on one side and Montclair on the other.

Osborne & Marsellis Company, Montclair, New Jersey, were the contractors.

The maximum grade was reduced from 9 per cent. to 2.60 per cent.

The total cost was \$8,966.80.

GLOUCESTER COUNTY.

Main Street, Williamstown, 1.77 Miles Long.

This road begins at Clayton avenue and extends through Main street, Williamstown, to the road leading to Fries' Mill. It is built of gravel, thirty-two feet wide, six and eight inches thick, fourteen feet in the center of which is paid for by the State and county, the remainder by the township.

The soil over which this road passes is very sandy and for this reason the improvement is much more noticeable. Forming, as it does, a continuation of the gravel road from Clayton, it furnishes an outlet for the farmers, truck-raisers and employes of the glass works to the railroad stations at Williamstown and Clayton.

John S. Fisler, Clayton, New Jersey, was the contractor.

The maximum grade was reduced from 3.50 per cent. to 2.50 per cent.

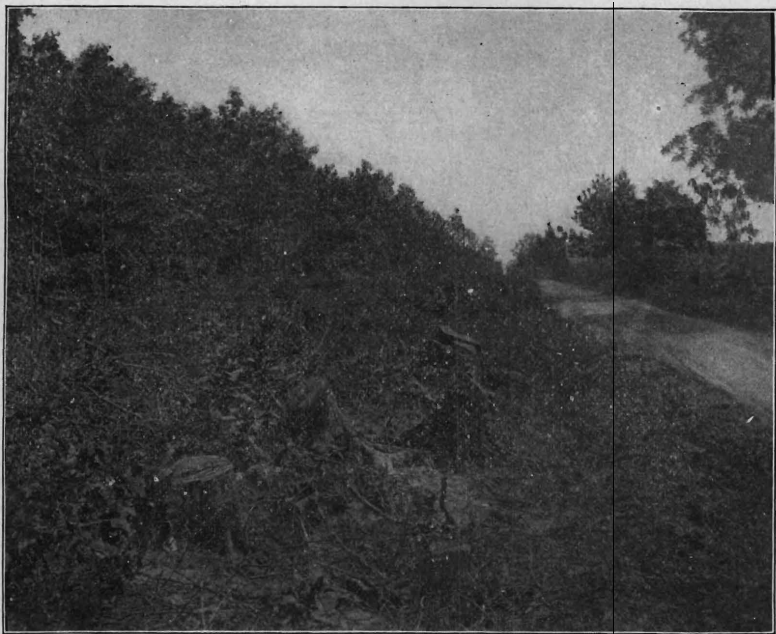
The price per cubic yard for compacted gravel was 30 cents.

The total cost was \$5,012.59.

Clayton and Williamstown Road, 5.96 Miles Long.

This road extends over a sandy, sandy loam and gravelly soil, through a moderately-good farming country, and connects the two enterprising glass manufacturing towns of Clayton and Williamstown. It is built of gravel, fourteen feet wide and six inches thick.

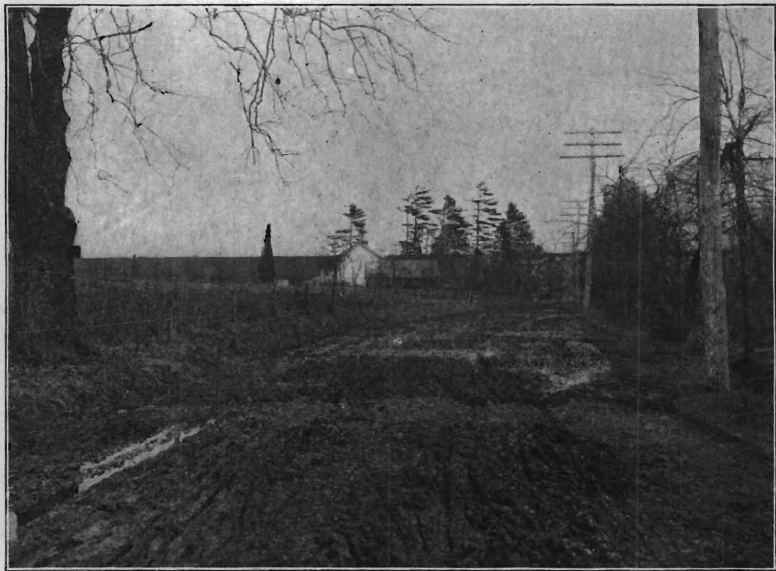
The material used in the construction of this road was gravel of a varying quality, and it formed a striking object lesson of the difficulties met with in obtaining proper gravel for road material.



Clayton and Williamstown Gravel road, Gloucester Co., opposite Jos. Dunn's, looking east, before improvement.



Clayton and Williamstown Gravel road, opposite Jos. Dunn's, looking east, after improvement.



River road, near Phila. and Reading Railroad crossing, Mercer Co., before improvement.

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Much of it was very promising on the surface, but when excavation commenced it proved to be very uncertain in quality.

Much land along this road has been lately cleared; near Williamstown there is fine farming country.

Smith Tomlin, Bridgeton, New Jersey, was the contractor.

The maximum grade was reduced from 4.2 per cent. to 2.5 per cent.

The cost per cubic yard for gravel was 30 cents.

The total cost was \$10,400.15.

MERCER COUNTY.

River Road, 5.95 Miles Long.

This road begins at the Asylum road and extends northwardly, in close proximity to the eastern bank of the Delaware river, to Washington's Crossing. It is constructed of macadam, fourteen feet wide and six inches thick.

This road will form the most beautiful and picturesque drive anywhere in the vicinity of Trenton. It might truly be described as a portion of the parking system of Mercer county, as its natural beauties far exceed those of that section of Essex upon which many hundreds of thousands of dollars have been spent. The artistic results obtained by this comparatively small outlay will equal those of the famous parking system of Essex county. Following, as it does, the winding course of the river, under the spreading branches of beautiful trees, through which we catch the play of sunlight and shadow upon the surface of the swiftly-flowing stream, it is destined in the near future to become the favorite resort for the lovers of nature.

This improvement converts that which was an almost impassable slough into a smooth and hard highway, upon which the residents of Trenton and vicinity may travel to and fro at all seasons of the year.

Richard Newton, Trenton, New Jersey, was the contractor.

The maximum grade was reduced from 8 per cent. to 4 per cent.

The cost per contract, lump sum, was \$38,248.

The total cost \$60,769.08.

Marshall's Corner and Woodsville Road, 2.43 Miles Long.

This road begins at the macadamized road at Marshall's Corner and extends northwardly to Woodsville, at the Hunterdon county line. It is constructed of macadam, twelve feet wide and six inches thick.

This road forms the northerly extension of the macadamized roads of Mercer county toward Flemington, the county seat of Hunterdon. It passes over a rough, hilly country, through a very fine peach district, and will form a much-needed outlet for the abundance of luscious fruit for which the northern portion of Mercer and the adjoining section of Hunterdon are so justly famous.

The Rocky Hill Construction Company, Rocky Hill, New Jersey, was the contractor.

The maximum grade was reduced from 10.6 per cent. to 7 per cent.

The cost per contract, lump sum, was \$17,850.

The total cost was \$30,801.44.

Centerville Road, 1.97 Miles Long.

This road begins at the borough line of Pennington and extends northeasterly to the Centerville school-house. It is constructed of macadam, twelve feet wide and six inches thick. It connects the farming district about Centerville school-house with Pennington, and from this point, by means of the stone road built in 1895, it completes the connection with Trenton. The building of this road converts what was an almost impassable slough into a hard, smooth thoroughfare, thus affording the farmers east of Pennington a good road to the markets of Trenton at all seasons.

John T. Carr & Company, Trenton, New Jersey, were the contractors.

The maximum grade was reduced from 5 per cent. to 2.75 per cent.

The price per contract, lump sum, was \$9,940.

The total cost was \$15,224.90.



Marshall's Corner and Woodsville road, Mercer Co., working on 15-foot rock cut, during construction.



Marshall's Corner and Woodsville road, Mercer Co., showing 15-foot rock cut, after improvement

Shabakunk Road, 1.95 Miles Long.

This road begins at Parkway avenue, Trenton, and extends to Union road, also a branch to Cross road. It is constructed of macadam, twelve feet wide and six inches thick.

This road lies midway between the Pennington and Princeton stone roads. Beginning, as it does, a short distance north of the reservoir, running thence northeasterly, it provides a section of country proverbial for its bad roads, with one smooth, hard means of communication with the city of Trenton.

John T. Carr & Company, Trenton, New Jersey, were the contractors.

The maximum grade was reduced from 5.40 per cent. to 3.64 per cent.

The price per contract, lump sum, was \$10,600.

The total cost was \$14,708.77.

MIDDLESEX COUNTY.

Oak Tree and Iselin Road, 1.25 Miles Long.

This road begins at the macadam road at Oak Tree and extends in a general easterly direction toward Iselin. It is constructed of macadam, twelve feet wide and eight inches thick.

This road forms a portion of the line from Plainfield to Woodbridge, and, with the contemplated extension during the coming year, will give the residents of the region between Somerville and Plainfield an outlet to Staten Island sound that they have long desired. Recognizing its future importance, it was deemed wise to straighten this road as much as possible, which was accordingly done, thus converting what had been a by-road into an improved highway.

Clarence M. Liddle, Woodbridge, New Jersey, was the contractor.

The maximum grade was reduced from 6 per cent. to 2.44 per cent.

The price per contract, lump sum, was \$10,604.04.

The total cost was \$11,231.13.

New Durham Road, 1 Mile Long.

This road begins at the end of the macadam upon the Amboy turnpike at New Durham, and extends along the said pike to the New Market and Stelton stone road, thus completing the through line from Perth Amboy to New Market and Somerville. It is constructed of macadam, twelve feet wide and eight inches thick.

While this improvement is of immediate benefit to only two farmers, yet its value, in connection with those already made, is far-reaching, connecting, as it does, the improved roads of the interior with those in proximity to the shore.

William T. McAdams, Metuchen, New Jersey, was the contractor.

The maximum grade was reduced from 3 per cent. to 2.51 per cent.

The price per contract, lump sum, was \$5,350.40.

The total cost was \$5,457.40.

Plainsboro and Aqueduct Road, 1.52 Miles Long.

This road begins at the railroad bridge and runs thence northwesterly, through a gently-undulating country to the Trenton and New Brunswick turnpike, thence southwesterly along said pike to the bridge over the Millstone river, the Mercer county line. It is constructed of macadam, twelve feet wide and eight inches thick.

This is the beginning of a line which is intended in time to extend through the rich farming lands along the Millstone river, connecting them with the constantly-growing markets of Princeton. The rich bottom-lands along the river and its tributaries afford abundant and excellent pasture for many cows.

Recognizing the desirability of this region from a dairyman's standpoint, the Walker-Gordon Company have located their extensive plant along the line of this road. From the nature of the soil over which this road is built, passage to and fro, during the winter and early spring, was rendered very difficult, many teams being unable to haul their burdens without assistance from the good-hearted farmers along its line. Now this is all changed. Teams trot over a road on which before they could at best only flounder.



New Brunswick and Bound Brook road, Middlesex Co., before improvement.



New Brunswick and Bound Brook road, Middlesex Co., after improvement.

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John H. Hurley, Trenton, New Jersey, was the contractor.

The maximum grade was reduced from 6 per cent. to 2.34 per cent.

The price per contract, lump sum, was \$8,320.05.

The total cost was \$9,396.45.

Red Tavern or Applegarth Road, 1 Mile Long.

This road begins at a point on the Hightstown and Manalapan stone road, two and one-half miles east of Hightstown, and extends northerly to Red Tavern. It is constructed of gravel, twelve feet wide and six to ten inches thick. This is a purely local road, and gives the residents between Red Tavern and the Hightstown and Manalapan road a good and convenient outlet to this through line.

Charles R. Le Compte, Lakewood, New Jersey, was the contractor.

The maximum grade was reduced from 7 per cent. to 3.41 per cent.

The cost per contract, lump sum, was \$2,495.64.

The total cost was \$3,000.

New Brunswick and Bound Brook Road, 2.50 Miles Long.

This road begins at a point in Piscataway township and extends to New Brunswick. It is constructed of macadam, twelve feet wide and eight inches thick. It runs through a very pretty and picturesque country, over a red shale soil. Along it are some fine farms and very pretty resident sites. When completed it will make an outlet for the citizens of New Brunswick towards Bound brook and the tributary country. The grades on this road were heavy, but they were largely reduced. The road before macadamizing was almost impassable in winter.

Van Deursen & Oliver, New Brunswick, New Jersey, were the contractors.

The maximum grade was reduced from 7 per cent. to 5 per cent.

The cost per contract, lump sum, was \$12,974.

The total cost was \$13,931.44.

Sayreville and South Amboy Road, 2.25 Miles Long.

This road begins at the draw-bridge or River road, and extends through Sayreville village towards South Amboy. It forms the first section of the Sayreville and South Amboy road, the remaining portion of which it is intended to improve next year. It is built of macadam, twelve feet wide and eight inches thick. This road runs by and over heavy clay beds which are being utilized by the numerous factories along its route. These are engaged in the manufacture of all kinds of bricks, variegated, common, ornamental, cornice and mantel. Much of this clay is shipped away in its crude state by rail, boat and wagon. The choicest grade is largely used by paper manufacturers for sizing paper. All this transportation of raw and manufactured material makes this improvement almost an absolute necessity. The only wonder is that the road has not been improved ere this.

Van Deursen & Oliver, New Brunswick, New Jersey, were the contractors.

The maximum grade before and after was $4\frac{1}{2}$ per cent.

The cost per contract, lump sum, was \$8,703.60.

The total cost was \$10,617.91.

MONMOUTH COUNTY.

Corliss Avenue, 4.47 Miles Long.

This road extends from Ocean Grove gates in a westerly direction toward Farmingdale. The first two and one-tenth miles of this road were built of macadam, sixteen feet wide and six inches deep, the remainder of gravel, sixteen feet wide and six inches deep.

Owing to the very heavy travel over the first two miles of this road, it was deemed unwise to use gravel. For this reason the specifications were changed, as above noted.

This road forms the principal inlet and outlet for the farmers of eastern Monmouth, hauling, as they do, the entire products of their farms and orchards to the large markets of the Park and Grove, and taking therefrom hundreds of loads of manure, which



Sayreville road, Middlesex Co., laying first course.



Sayreville road, Middlesex Co., after improvement.



Corliss Avenue, Monmouth Co., before improvement.



Corliss Avenue, Monmouth Co., after improvement.

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in their turn, serve still further to increase the productivity of the soil.

This was a very much needed road and is highly appreciated by the residents of this section, and its beneficial effects are already evidenced by the numerous improvements completed and in process of completion along this drive.

William C. Shanley, Jersey City, New Jersey, was the contractor.

The maximum grade was reduced from 7.40 per cent. to 3.50 per cent.

The price per contract, lump sum, was \$17,309.50.

The total cost, exclusive of gravel, was \$18,045.

Second, John, Church and Front Streets, Keyport, .78 of a Mile Long.

This road begins at Chingarora creek and extends to Broad street, in the town of Keyport. It is built of macadam, sixteen feet wide and eight inches deep.

The streets composing this improved line form the connecting link between the Keyport and Keansburg road, improved in 1900 and 1901, and the steamboat dock at Keyport.

This road, for its length, is probably of greater value than any other constructed this year, as it closes the gap between the road already built through the large trucking district of Raritan township and the steamboat dock at Keyport.

Keyport has long been the shipping port for the truck raisers of northern Monmouth, and a daily line of steamboats conveys the products of Monmouth's soil to the great market of New York City.

J. Roosevelt Shanley, Jersey City, New Jersey, was the contractor.

The maximum grade was reduced from 7 per cent to 6 per cent.

The price per contract, lump sum, was \$5,102.30.

The total cost was \$5,731.

Manalapan and Freehold Road, First Section, 2.92 Miles Long.

This road begins at the cross-roads in Manalapan village and extends to the stone road at Millhurst. It is constructed of macadam, fourteen feet wide and eight inches deep. It runs through a rolling farming country, over a light, sandy soil. The country through which it passes is a part of Monmouth county's famous agricultural and revolutionary district; therefore this road will be valuable to both the agriculturist and pleasure seeker, giving to the former a convenient outlet to the markets, and to the latter a far better highway over which to travel in making his pilgrimage to the battlefields of Monmouth. It is hoped within the next two or three years to complete this line to the seashore, thus making a good, hard road from the Delaware river to the Atlantic ocean.

Charles R. Le Compte, Lakewood, New Jersey, and James H. Butcher, Ardena, New Jersey, were the contractors.

The maximum grade was reduced from 2.16 per cent. to 1.56 per cent.

The price per contract, lump sum, was \$23,205.

The total cost was \$24,069.

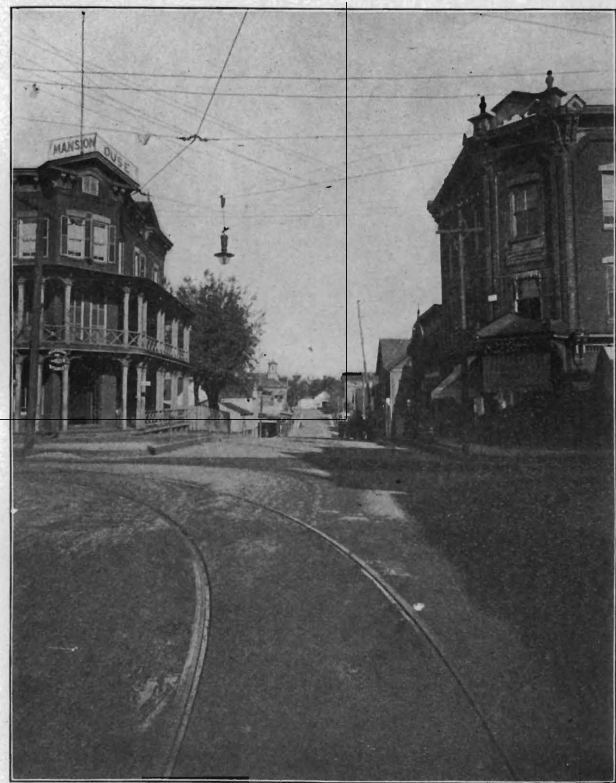
Mansquan River and Belmar Road, 6.29 Miles Long.

This road begins at Manasquan river bridge and extends to F street, in Belmar. It is built of gravel, sixteen feet wide, four and seven inches deep. This is another long link in our shore road line. As it is a continuation of the improved roads which now extend from Atlantic Highlands to Belmar, along or in close proximity to the sea beach, it forms one of the most beautiful and pleasant summer drives to be found anywhere along our Atlantic seaboard. At Point Pleasant it connects with the Point Pleasant and Lakewood road, and thence with the improved roads built and being built from Lakewood to Atlantic City, thus giving our State one of the finest and longest touring roads in the world.

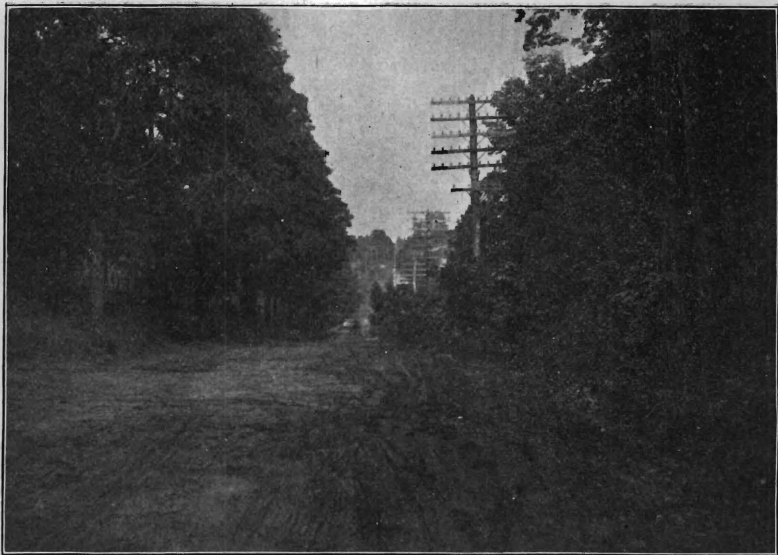
Alexander Mullen, Avon, New Jersey, was the contractor.



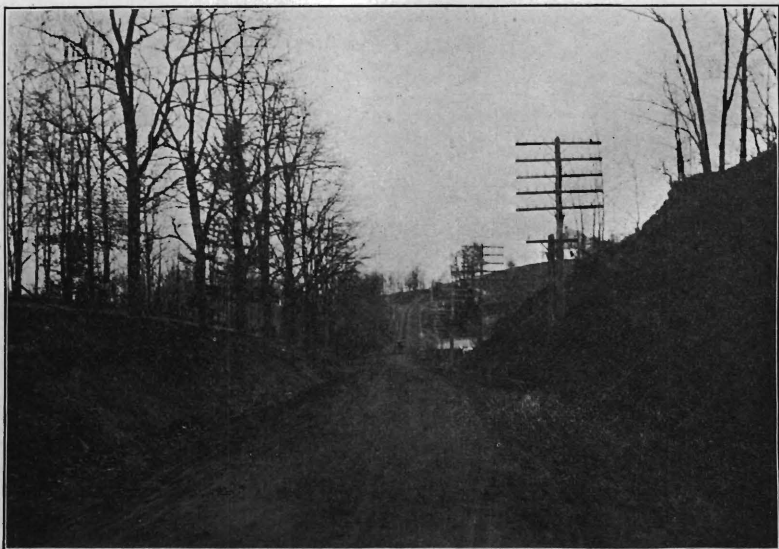
Front Street, Keyport, Monmouth Co., looking east from junction of Broad,
before improvement.



Front Street Stone road, Keyport, Monmouth Co., after improvement.



Extension Navesink road, Monmouth Co., Water Witch Club entrance, before improvement.



Extension Navesink road, Monmouth Co., Water Witch Club entrance, after completion.

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The maximum grade was reduced from 3.50 per cent. to 2 per cent.

The price per contract, lump sum, was \$11,156.06.

The total cost was \$14,063.38.

Ocean Avenue, 1.76 Miles Long.

This road extends from North Long Branch to the borough of Seabright. It is constructed of macadam, sixteen feet wide and eight inches thick. This drive is extensively used. It passes the magnificent residences of the millionaires of Monmouth Beach, and is a part of what will some time be the great ocean speedway, extending from the Highlands to Sea Girt. It is the first stone road that has been built along the beach, and will be much used by the thousands who daily pass along this sea-front during the summer season.

J. R. Shanley, Newark, New Jersey, was the contractor.

The maximum grade was reduced from 2.30 per cent. to 2 per cent.

The cost per contract, lump sum, was \$15,013.18.

The total cost was \$30,786.58.

Extension of Navesink Road, 2.32 Miles Long.

This road begins at the east line of the stone church property, in the township of Middletown, and extends to the Highland draw-bridge. It is constructed of gravel, sixteen feet wide and seven inches thick.

This road forms a connection with the improved roads in and around Atlantic Highlands. It affords a drive from the draw-bridge at the Highlands to Seabright and Monmouth Beach, virtually connecting Atlantic Highlands proper with the whole southern shore. It passes through a succession of picturesque hills and valleys, in which the Water Witch Company and other land companies are building handsome residences upon hills which command the ocean and surrounding country for long distances. It passes through clay and sandy loam hills, very wild and pictur-

esque, which are now being filled with the summer homes of wealthy people. The road is a much-needed improvement for the development of this whole district.

Jonathan T. Stout, Middletown, New Jersey, was the contractor.

The maximum grade was reduced from 11 per cent. to 9 per cent.

The cost per contract, lump sum, was \$6,700.

The total cost was \$10,184.

Main Street, Matawan, 1.50 Miles Long.

This road begins at the New York and Long Branch railroad station, in the township of Matawan, and extends to Frenen station, on the Freehold and Atlantic Highlands railroad. It is constructed of macadam, sixteen feet wide and eight inches thick.

This road extends principally through the town of Matawan and connects the stone road system of Middlesex county with the gravel system of Monmouth county, thus forming a continuous line of improved roads from New Brunswick to Freehold and Long Branch.

J. R. Shanley, Newark, New Jersey, was the contractor.

The maximum grade was reduced from 3.1 per cent. to 2.9 per cent.

The price per contract, lump sum, was \$12,660.91.

The total cost was \$13,439.74.

MORRIS COUNTY.

Newark and Pompton Turnpike, .75 of a Mile Long.

This road begins at the end of the present macadam and extends three-quarters of a mile westward along the old turnpike. It is constructed of macadam, twelve feet wide and six inches thick.

Beginning where the improvement of this road ended last year, the macadamizing has been extended three-quarters of a mile further, past the church, to the easterly edge of the village of Pompton Plains, thus giving the inhabitants a good outlet at all seasons



Main Street, Matawan, Monmouth Co., before improvement.



Main Street, Matawan, Monmouth Co., after improvement.

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to the stone roads leading to Newark and Paterson. This in itself is of great value to the people, but the full benefits of this macadam will not be felt until the improvement of the old turnpike has been carried forward to the river bridge at Pompton, where it connects with the Paterson and Hamburg turnpike. It is hoped that the improvement of this road will be pushed forward as speedily as possible, in order that the State and county, as well as the township, may reap the benefit which its completion will surely bring.

Colfax & Steele, Pompton, New Jersey, were the contractors.

The road was and is practically level.

The price per contract, lump sum, was \$3,225.40.

The total cost was \$3,636.84.

Green Village Road, 3.40 Miles Long.

This road begins at South street, Morristown, and extends to the village green at Green Village. It is constructed of macadam, twelve feet wide and six inches thick.

This improvement extends through a gently-rolling country, past many fine suburban residences and a few good farms, to the peaceful hamlet of Green Village. The hill along which the road is built, for a greater part of its length, is admirably adapted for country residences, as the view obtained from it, across the valley of the Loantaca, is one to please the eye of any lover of nature.

John S. Dickerson and William Gill, Rockaway, New Jersey, were the contractors.

The maximum grade was reduced from 9.1 per cent. to 5 per cent.

The price per contract, lump sum, was \$14,603.31.

The total cost was \$23,056.88.

Sussex and Newton Turnpike, 1.75 Miles Long, 1.07 Miles of Which Were Built This Year.

This road begins at the intersection of the Sussex and Newton turnpike with the road from Ledgewood to Port Morris, and extends to the Netcong borough line. It is constructed of macadam, twelve feet wide and six inches thick.

Owing to a lack of funds, only one mile of it was built this year. When completed it will shorten the distance from Succasunna to Stanhope one and one-half miles.

This is another section of the same famous turnpike which passes over Mount Freedom, and by which it is connected with the road through Succasunna Plains.

Salmon Brothers, Hackettstown, New Jersey, were the contractors.

The maximum grade was reduced from 14 per cent. to 6 per cent.

The price per contract, lump sum, was \$7,571.

The total cost of 1.07 miles, completed this year, was \$12,209.55.

*Lincoln Park, Montville and Boonton Road, 4.28 Miles Long.
1.34 Miles of Which Were Completed This Year.*

This road begins at the Beavertown inclined plane and follows the line of the Morris canal to the Boonton township line. It is constructed of macadam, twelve feet wide and six inches thick. It follows the various windings of the Morris canal, through a most picturesque valley, crossing and recrossing the canal as though loath to leave it, but the reason is not far to seek. The valley is so narrow and the hills on each side are so steep that in many places there is scarcely room enough for these two thoroughfares.

The valley which it traverses is the only gap through the hills which separate the Rockaway and Pompton valleys. Here we see the products of the engineering skill of the present and past generations side by side.

This road once more brings the inhabitants of Boonton and the region round about into easy communication with the large manufacturing city of Paterson, and also gives them access to the many miles of improved highways which extend in every direction from the latter city.

One and thirty-four hundredths miles of this road are paid for this year. The remainder will be completed in time to claim a portion of the 1904 fund.

William J. and Arthur G. Bunn, Paterson, New Jersey, were the contractors.

The maximum grade was reduced from 9 per cent. to 6 per cent.

The price per contract, lump sum, was \$13,919.70.

The total cost of 1.34 miles, completed this year, was \$8,672.77.



Till Hill, Mount Freedom road, Morris Co., Fill and Macadam below.



Till Hill, Mount Freedom road, Morris Co., Till Hill cut and Macadam.

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Mount Freedom Road or Newton Turnpike.

This road extends from the outskirts of Moristown west principally through a mountainous, wild and picturesque country. The portion lying in Randolph township is 6.07 miles long.

Owing to the excessive amount of grading necessary to make this road really useful, it was found imposibile to complete it this year. The eastern end, .57 of a mile in length, was completed this year. It is built of macadam, twelve feet wide and six inches thick. The soil is a drift boulder, underlaid with granite, which crops out on the surface in many places, thus making the grading very costly.

When this road shall have been completed it will form a direct outlet for the inhabitants of the northern portion of Morris county to the county seat at Morristown, which is now reached by a very roundabout way. This is the most direct route, but, owing to the excessive grades encountered, many places exceeding sixteen feet to the hundred, it has been avoided by travelers. The reduction of these excessive grades will restore this old stage route to its original position of the main line from Morristown northwest. This section has no macadam roads and therefore demands attention, according to the terms of the State Aid law, requiring that all portions of the State shall receive the benefits of its aid.

Milton J. Black, Rockaway, New Jersey, was the contractor.

The maximum grade was reduced from 16 per cent. to 6.33 per cent.

The price per square yard for macadam, native rock, was 36 cents.

The total cost of the portion built this year was \$14,170.93.

OCEAN COUNTY.

Little Egg Harbor Shore Road, First Section, 2.04 Miles Long.

This road begins at the Mathistown bridge and extends easterly to Chapel street, West Tuckerton. It is built of gravel, sixteen feet wide, six to nine inches thick.

This road is the beginning of Ocean county's contribution toward the ocean boulevard from Atlantic City to the seaside resorts along the northern shore. Commencing, as it does, at the Burlington county line, it forms a continuation of good-road system of Atlantic and Burlington counties, and provides the farmers and bay men good means of communication with Tuckerton, the banking and commercial town of this portion of the State.

Charles W. Mathis, Tuckerton, New Jersey, and Aaron M. Mathis, New Gretna, New Jersey, were the contractors.

The maximum grade was reduced from 5.50 per cent. to 1.9 per cent.

The price per contract, lump sum, was \$5,595.55.

The total cost was \$5,839.96.

Little Egg Harbor Shore Road, Second Section, 1.25 Miles Long.

This road begins at Chapel street, in West Tuckerton, and extends to the Davis-Price line, East Tuckerton. It is constructed of gravel, sixteen and thirty feet wide, and varies in thickness from four to nine inches.

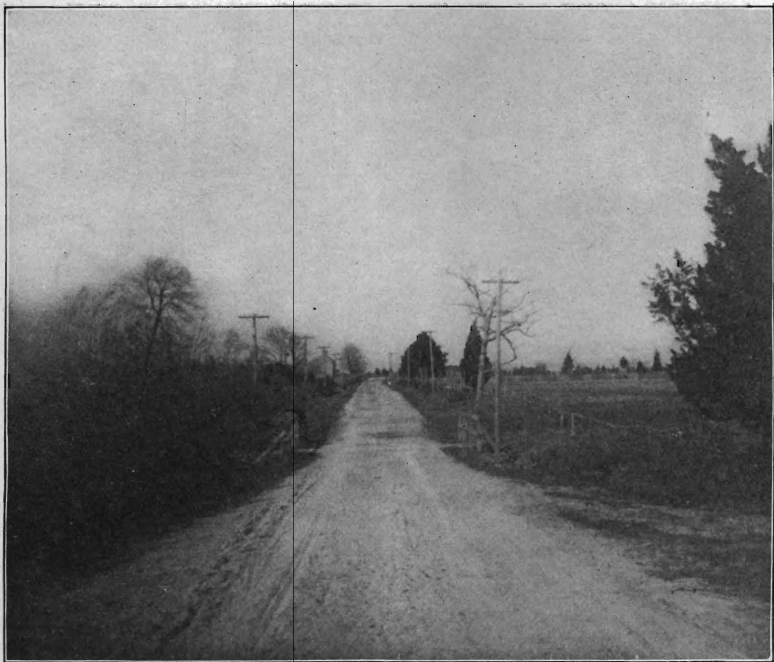
This section is built through the main street of the town of Tuckerton, and, as the surface was composed of good gravel, it was deemed best to spread the new coating of gravel over a greater width; consequently, through the town the depth of gravel is from four to six inches and its width thirty feet, while the extremities, which extend through a more sparsely-settled section, have a width of sixteen feet and a depth of from six to nine inches. The result is that Tuckerton has as fine and smooth a boulevard as any town of like size in the State.

Aaron M. Mathis and Charles W. Mathis, New Gretna, New Jersey, and Samuel A. Headley, Tuckerton, New Jersey, were the contractors.

The maximum grade was reduced from 5 per cent. to 2 per cent.

The price per contract, lump sum, was \$2,286.47.

The total cost was \$2,323.97.



Little Egg Harbor Township County road, Ocean Co., before improvement.



Little Egg Harbor Township County road, 1903, after improvement.

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Little Egg Harbor Shore Road, Third Section, 2.11 Miles Long.

This road begins at the Davis-Price line, in East Tuckerton, and extends to the Eagleswood township line. It is built of gravel, sixteen feet wide, six to nine inches thick.

This section completes the Ocean boulevard through Little Egg Harbor township, and converts the road into a fine boulevard, which is daily becoming more popular, not only with the residents of the township, but also with the automobilists and other pleasure seekers who visit our seacoast during the summer season, and bids fair to restore Tuckerton to the prominent position it so long held in the early history of our State.

Aaron M. Mathis and Charles W. Mathis, New Gretna, New Jersey, and Samuel A. Headley, Tuckerton, New Jersey, were the contractors.

The maximum grade was reduced from 6 per cent. to 2.1 per cent.

The price per contract, lump sum, was \$4,888.10.

The total cost was \$6,188.12.

Sea Avenue, .87 of a Mile Long.

This road begins at West Point Pleasant and extends to the west line of the borough of Point Pleasant Beach. It is constructed of gravel, sixteen feet wide, six to nine inches thick.

Beginning at the end of the Lakewood and Point Pleasant road, it carries this improvement to the westerly boundary line of the borough of Point Pleasant Beach. From thence the improvement is carried onward by the borough to the seashore, thus giving the inhabitants of Lakewood something they had long wished for, namely, a hard, smooth drive from that beautiful resort to the Atlantic ocean.

John Thompson, Avon, New Jersey, was the contractor.

The road was and is practically level.

The price per contract, lump sum, was \$2,687.87.

The total cost was \$3,259.13.

TENTH ANNUAL REPORT.

Lakewood Road, 7.60 Miles Long.

This road begins at West Point Pleasant and extends to the easterly suburbs of Lakewood. It is built of gravel, sixteen feet wide, six and nine inches thick. It connects the noted winter resort of Lakewood with the summer seashore resort of Point Pleasant. It is built over a sandy and sandy loam soil, through a moderately well-settled farming district. There are some small towns along the route. It forms an easy outlet from Lakewood for the automobiles and many fine teams that daily sally out of Lakewood.

This is one of a series of roads which are being built in every direction out of Lakewood to give the winter dwellers of this sanitarium pine resort easy access with the outside world. It was built of gravel on one end from the Lakewood gravel pits and on the easterly end from the Squankum gravel pits. It was an expensive road to construct on account of the long distance which the gravel had to be carted.

This road was let under two contracts.

John B. Peters and Thomas J. McKenna were the contractors for the first section.

James H. Butcher and J. H. Vanschoick were the contractors for the second section.

The maximum grade was reduced from 3.86 per cent. to 2 per cent.

The cost per first contract was \$18,498.

The cost per second contract was \$10,715.98.

The total cost was \$29,213.98.

PASSAIC COUNTY.

Clove Road, .88 Miles Long.

This road begins at the Little Falls road and winds along the side of the mountain to the road passing through Great Notch. It is built of macadam, sixteen feet wide and four inches thick.

This road forms a beautiful pleasure drive from the city of Paterson southerly along the side of the mountain, and gives the



Sea Avenue, Point Pleasant, Ocean Co., before improvement.



Sea Avenue, Point Pleasant, Ocean Co., after improvement.

traveler an opportunity to enjoy the fresh air and beautiful scenery of the mountain within a very short distance of the noise, confusion and turmoil of the busy manufacturing city of Paterson. It may be very properly described as one of the breathing spots for the tired and weary toilers, where they may rest and refresh themselves and gain new vigor for their daily work.

William A. Ferguson, Paterson, New Jersey, was the contractor.

The maximum grade was reduced from 9 per cent. to 6 per cent.

The price per square yard for macadam was 27 cents.

The total cost was \$7,304.43.

East Thirty-First Street, 1 Mile Long.

This street begins at Twelfth avenue and extends to Market street. It is built of macadam, twenty-eight feet wide and four inches thick. It connects the two finest residential sections of East Paterson and makes available to the residents of those sections all the improved streets and avenues of the eastern or hill section, thus rendering the improvements already made doubly beneficial to both business men and pleasure seekers.

As this street was already graded, curbed and guttered, the money ordinarily required for grading was used to increase the width of the macadamizing, thus completing the improvement which the city had already begun.

McKiernan & Bergin, Paterson, New Jersey, were the contractors.

The road was and is practically level.

The price per square yard for macadam was 33 cents.

The total cost was \$5,727.37.

Squaw Brook Road, 1.46 Miles Long.

This road begins at the Squaw Brook bridge and extends north-erly to the Bergen county line. It is constructed of macadam, fourteen feet wide and four inches thick. It forms an outlet from Paterson to the suburban resident section of Bergen county. It

traverses a very rough and rugged portion of Passaic county. Its principal use will be to lift the mantle of discouragement from the shoulders of the residents along its course.

Colfax & Steele, Preakness, New Jersey, were the contractors.

The maximum grade was reduced from 7 per cent to 5 per cent.

The price per square yard for four-inch macadam was 18 cents.

The total cost was \$4,185.37.

Macopin Road, 2.75 Miles Long.

This road begins at the Paterson and Hamburg turnpike and extends to the northerly line of Andrew M. Schulster's property, townships of West Milford and Pompton. It is constructed of macadam, fourteen feet wide and four inches thick.

This road forms a short cut for the sportsmen of Paterson from the Paterson and Hamburg turnpike to the fishing and hunting preserves in the vicinity of Lake Macopin. It extends through a very picturesque and heavily-timbered section, affording a most delightful and beautifully-shaded pleasure drive for the business men and manufacturers of Paterson and its suburbs.

Colfax & Steele, Preakness, New Jersey, were the contractors.

The maximum grade was reduced from 12.62 per cent. to 8 per cent.

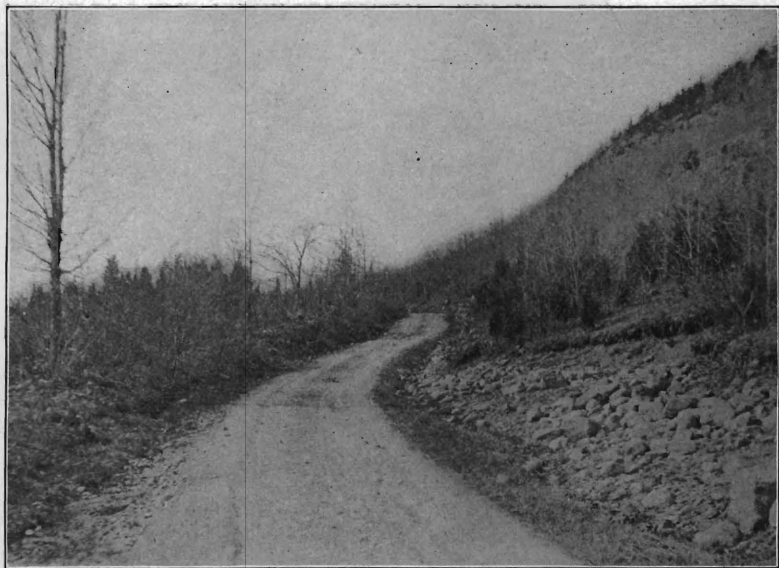
The price per square yard four four-inch macadam was 18 cents.

The total cost was \$10,568.

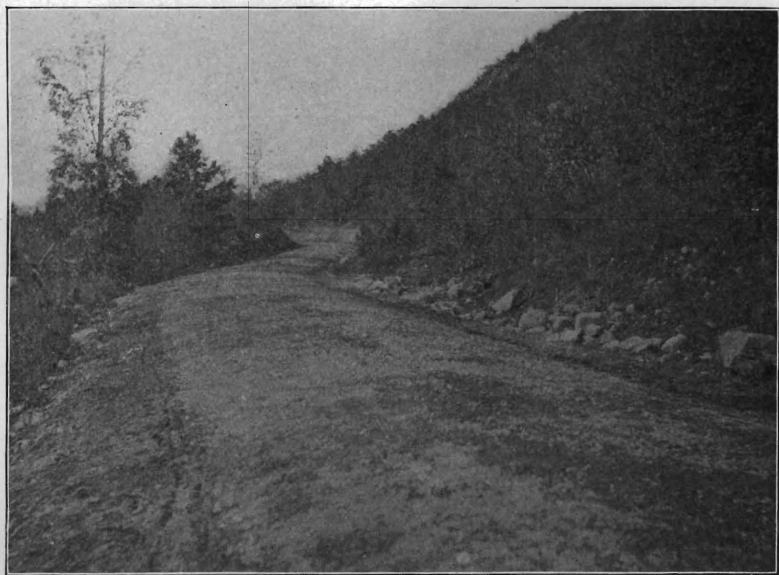
SALEM COUNTY.

Elmer and Alloway Road, 3.87 Miles Long.

This road begins at the borough line of Elmer and extends westerly to Alloway. It is built of gravel, fourteen feet wide, six to eight inches thick, and forms a good and convenient means of communication between the rich farming lands lying west of Elmer and that thriving borough and railway station. As the soil over which this road is built is a clayey loam, it makes very good



Macopin road, Passaic Co., from Butler, N. J., before improvement.



Macopin road, Passaic Co., after improvement.

farming land, but a very poor road material; consequently, it was often found difficult to transport the abundant crops, raised along its line, to the market and railway station, thus entailing great loss upon the farmers and dairymen. By the construction of this road things are entirely changed, and the people along its line can transport the product of their lands easily and quickly at all seasons of the year.

B. F. Sweeten & Son, Camden, New Jersey, were the contractors.

The maximum grade was reduced from 4.1 per cent. to 2.1 per cent.

The price per contract, lump sum, was \$9,409.75.

The total cost was \$11,123.20.

Salem and Hancock's Bridge Road, 1.07 Miles Long, of Which .33 of a Mile Was Paid for Last Year, and the Remainder, or .74 of a Mile, Paid for This Year.

This road extends from Lower Alloway's creek to the city of Salem. It is constructed of oyster shells, ten feet wide and twelve inches thick. Owing to the nature of the soil, it was found necessary to use a much larger quantity of oyster shells than had been originally intended, and further, owing to the scarcity of shells, the price of the same was quadrupled. Thus the cost of the road was increased considerably beyond the original estimate. Nevertheless, as this road is the connecting link between the macadamized road in the city of Salem and the oyster shell road at Hancock's Bridge, thus making a through line from Hancock's Bridge to Salem, it is worth all and more than it has cost the inhabitants of Salem and vicinity.

Joseph Develin, Philadelphia, Pa., and B. M. Sweeten & Son, Camden, New Jersey, were the contractors.

The maximum grade was reduced from 3 per cent. to 2 per cent.

The total cost was \$4,300.33.

The remainder due from the State, \$1,033.01, was paid this year.

SOMERSET COUNTY.

Neshanic Road, 6.24 Miles Long.

This road begins at Wood's tavern and extends westerly through Frankfort and Neshanic to the easterly end of the bridge over the south branch of the Raritan river, near Neshanic station; also a spur from Frankfort to Flagtown, terminating at the South Branch railroad. Owing to the nature of the soil, we have two different methods of construction upon this road, namely, 3.068 miles of telford, twelve feet wide and ten inches thick, and 3.172 miles of macadam, twelve feet wide and eight inches thick.

This is one of the oldest and most famous roads in Somerset county, being a portion of the noted Amwell road, over which, for generations, the farmers of Hunterdon and Somerset carted the produce of their farms and orchards to the head of navigation on the Raritan river, at New Brunswick, before the days of the canal. The road is used at the present time by all the cultivators of the soil in this portion of the Millstone valley for the purpose of transporting the hay and grain raised upon their lands to the hay presses and mills at South River and Neshanic. In fact, it is the principal outlet for all of this region, and the change wrought by this improvement is one of the most marked in recent years.

Richards & Gaston, Somerville, New Jersey, were the contractors.

The maximum grade was reduced from 13.50 per cent. to 8 per cent.

The price per contract, lump sum, was \$40,009.68.

The total cost was \$44,000.

SUSSEX COUNTY.

Sparta and Newton Road, 1 Mile Long.

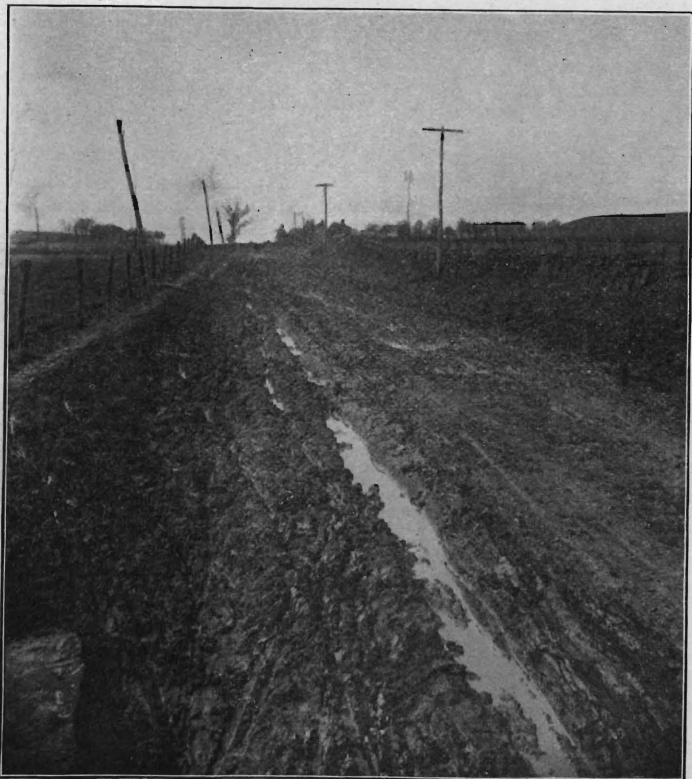
This road extends from Sparta toward Newton, being a portion of the old Newton turnpike. It is constructed of macadam, twelve feet wide and eight inches thick, the materials for which were procured along the line of the road.



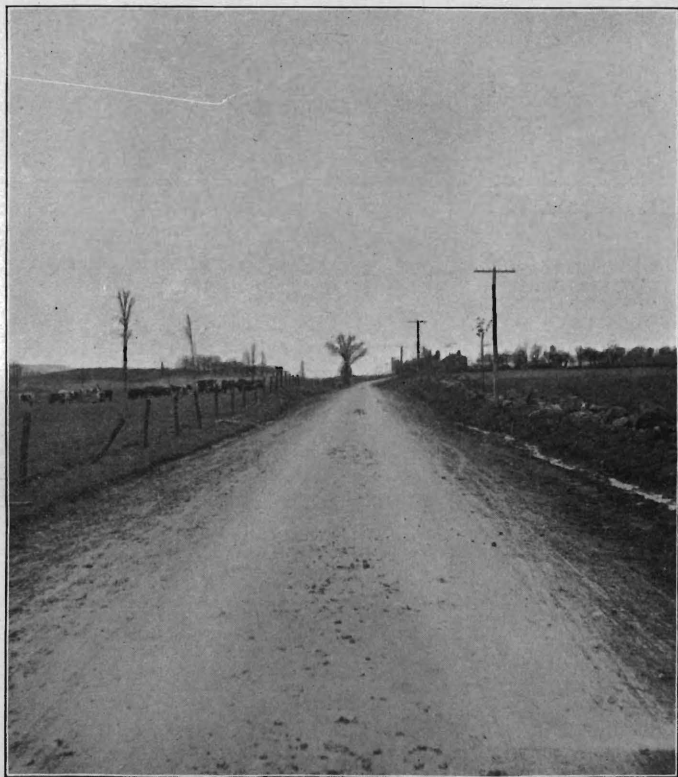
Neshanic road, Somerset Co., before improvement.



Neshanic road, Somerset Co., after improvement.



Sussex and Newton road, Sussex Co., before improvement.



Sussex and Newton road, Sussex Co., after improvement.

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The country over which the road is built consists of a series of knolls of varying form and size, formed by the deposits of the great ice field which once buried this section of New Jersey.

The grades on the original road were of many degrees, and have now been reduced from a maximum of 10.5 per cent. to one of 5.9 per cent., thus, to a high degree, promoting the ease and convenience of intercommunication among the inhabitants living along its line.

Samuel G. McKiernan and James Bergin, Paterson, New Jersey, were the contractors.

The price per contract, lump sum, was \$4,406.20.

The maximum grade was reduced from 11 per cent. to 5.9 per cent.

The total cost was \$5,080.55.

Sussex and Newton Road, 1.50 Miles Long.

This road begins at the borough line of Sussex and forms the continuation of a street which the borough authorities of Sussex are preparing to improve, thus, in reality, making the beginning point of this improvement the business center of the borough. It winds around a hill, thence along the rim of a beautiful valley, which is covered with fine grazing and grass farms, toward the county seat at Newton. It is the intention to extend this improvement until this thriving borough is connected with Newton, thus uniting the two most important places in the county. It is a portion of the old Sussex and Newton turnpike, the original through road to the Delaware.

This road was macadamized with native rock, gathered along its line. By this means the expense was greatly reduced, and the State and county secured a macadamized road, twelve feet wide and eight inches thick, much more cheaply than the same could be obtained in many other portions of the State.

Samuel G. McKiernan and James Bergin, Paterson, New Jersey, were the contractors.

The maximum grade was reduced from 9.5 per cent. to 4.33 per cent.

The price per contract, lump sum, was \$6,611.20.

The total cost was \$7,573.38.

Stanhope and Newton Road, 1.53 Miles Long.

The improvement, consummated this year, is a portion of the twelve miles of highway extending from Stanhope to Newton. It passes through a very picturesque country, composed of a succession of mountains and valleys, studded with immense boulders and watered by innumerable springs. The land was once covered with a heavy growth of timber, which was cut down and marketed before the era of anthracite coal burning. It is now covered with a quantity of second growth timber, interspersed here and there with small clearings.

When the many boulders and smaller stones along the line of this road have been crushed into suitably-sized road metal, and placed upon a well-graded road surface, for a width of twelve feet and a depth of eight inches, throughout its whole line, as it has been over this one and one-half miles, the road will be as pleasant for travel as the scenery along its line is beautiful.

Augustus Munson and Milton J. Black, Rockaway, New Jersey, were the contractors.

The maximum grade, was reduced from 10 per cent. to 7 per cent.

The price per contract, lump sum, was \$7,807.60.

The total cost was \$9,239.70.

WARREN COUNTY.

Danville Road, 4.87 Miles Long, 1.20 Miles of Which Were Built This Year.

This road begins at the canal bridge in Hackettstown and passes around and over many steep hills, through the pretty village of Vienna, thence past an immense gravel bed, the materials from which have been used to great advantage in the improvement of the road through Vienna, to the intersection of the township lines of Hope and Independence, at Danville. The improvement consists of macadam, twelve and sixteen feet wide and six inches thick.

Owing to the very steep grades encountered along the line of the original road, it was found necessary to change its route at two points, one of these near the beginning of the road, the other east of Vienna. By so doing we were able to reduce the maximum grade from 13.50 per cent. to 6 per cent.

The highway improved is a portion of the road connecting Belvidere, on the Delaware, with the county seat at Hackettstown, and is one of the oldest and most frequented thoroughfares extending east and west across the county of Warren. Near its line, at the base of Jenny Jump mountain, lie the Great Meadows, far famed for their fertility, on whose deep vegetable soil are raised large quantities of onions and celery, the fine quality of which has spread their fame both far and wide, with the result that hundreds of loads of these products of the soil are hauled over this road to the railway for shipment to the metropolitan markets.

The scenery along this improved route is varied, hill and valley following one another in rapid succession, and boulders both large and small thickly dotting the landscape.

The rocky and stony character of the soil has proved to be a benefit rather than a detriment in the improvement of this highway, as the material for the construction of the pavement was right at hand; consequently, the cost was greatly reduced and the very rocks and stones, over which wagons bumped and bounded for generations, have been converted into road metal over which the aforesaid vehicles roll smoothly and quickly.

Salmon Brothers, Ledgewood, New Jersey, were the contractors.

The maximum grade was reduced from 10.20 per cent. to 6 per cent.

The price per contract, lump sum, was \$23,587.37.

The total cost of 1.20 miles, completed this year, was \$7,864.55.

Stewartsville Road, 3.71 Miles Long, 1.28 Miles of Which Were Built This Year.

This road begins at the macadamized pavement on Morris turnpike, completed last year, and extends across the canal to the town of Stewartsville, thence, turning westward, runs to Insley's Corner. At the turn in Stewartsville there are two branches, which

leave the main line, one toward Merrell's bridge, the other to the cemetery. It is built of macadam, twelve and sixteen feet wide and six inches thick. It forms a portion of the through line to Phillipsburg and Easton, the great markets for the agricultural products of this region.

In connection with the Straw Church road it forms a continuation of the improved highway from Washington to Phillipsburg.

Salmon Brothers, Ledgewood, New Jersey, were the contractors.

The maximum grade was reduced from 12 per cent. to 7.50 per cent.

The price per contract, lump sum, was \$23,183.96.

The total cost of 1.28 miles, completed this year, was \$10,859.84.

Straw Church Road, 1.46 Miles Long.

This improvement begins at the end of the macadam on the Stewartsville road, at Insley's Corner, and continues toward Phillipsburg to the line between Pohatcong and Lopatcong townships, from which point the highway has already been improved into Phillipsburg. It is constructed of macadam, twelve feet wide and six inches thick.

In connection with the Stewartsville road and a portion of Morris turnpike, already improved, the farmers of Warren county are, by this road, provided with a good, smooth, hard way over which to transport the straw, hay, corn, wheat and milk produced upon their land to the markets of Phillipsburg and Easton. The large and rapidly-growing industries located in these two places create a great and constantly-increasing demand for all of the agricultural products of the region round about. As the tonnage is constantly increasing, owing to the fact that the farmers are becoming more intensive in the cultivation of the soil, the necessity for improved roads becomes more and more apparent and the demand for them more insistent.

Salmon Brothers, Ledgewood, New Jersey, were the contractors.

The maximum grade was reduced from 12 per cent. to 7 per cent.

The price per contract, lump sum, was \$7,809.17.

The total cost was \$8,781.69.



Stewartsville road, Warren Co., before improvement.



Stewartsville road, Warren Co., after improvement.

Road Improvement in New Jersey for the Year 1903.

There has been no cessation in the demand for good roads. Over seventy different improvements have been started, aggregating one hundred and ninety miles, about one hundred and fifty-three miles of which have been sufficiently advanced to command this year's appropriation. If the amount apportioned by the State had been increased to \$400,000, the sum allowed by the new law, it would all have been consumed, and then would have come short of meeting the demands of the numerous petitions.

Under the stimulus of the State Aid law, the counties of Atlantic, Bergen, Burlington, Camden, Cape May, Cumberland, Essex, Gloucester, Hudson, Mercer, Middlesex, Monmouth, Morris, Ocean, Passaic, Salem, Somerset, Sussex and Warren are engaged in road building. The counties of Hunterdon and Union have not demanded any portion of the State aid this year.

In our ten years of road building this has been the most difficult we have encountered, the progress of the work having been greatly delayed by the excessive rainfall in all parts of the State and the scarcity of labor and teams, it being almost impossible at times to secure an adequate supply of the latter, owing to the great amount of municipal work. Consequently, construction was retarded to such an extent that it is in a more backward condition than in any previous year, and, owing to the great demand for labor and material of all kinds, the prices for the same were so much higher that many of our roads cost 20 per cent. more than they did in previous years.

The following is a condensed account of the progress of the work in the different counties of the State this year:

Atlantic county finished the construction of the Absecon and Chestnut Neck road, eleven miles long, connecting Atlantic City with the Burlington county system of roads. This, in connection with the Ocean county roads, about thirty-eight miles, which are

being rapidly built, will form a continuous improved highway between Atlantic City and Long Branch.

The boulevard from Pleasantville to Atlantic City, 3.58 miles long, has been gradually raised above the surface of the meadows. This road, sixty feet in width, is being constructed by pumping sand out of the thoroughfares; walls of sod, four feet high, are built across the meadow on each side of the sixty feet, and the sand is pumped in until the space is filled. When done the road will be seven feet above the surface of the meadows. In the building of this road we encountered some very bad salt marshes or sinks, upon which it seemed impossible, either by walls of earth or bulkheads, to form an embankment, due to the fact that there was nothing to retain the sand after it was pumped into the space prepared to receive it; therefore, we were compelled to increase the width over these spots in order to obtain sufficient resistance to flow, so that the sand might be retained until enough of it had been deposited to press out the ooze and form a solid foundation of sand. In some places the depth of this soft matter exceeded twenty-five feet. Encountering two thousand feet of this troublesome marsh has increased the cost of construction over the original estimate from \$10,000 to \$15,000.

This improvement, with the bridges across the thoroughfares along its line, will be completed early during the coming year, and will add materially to the value of Atlantic City and Pleasantville property, by affording a pleasant and convenient means of transit for the immense amount of pleasure and business travel which is now waiting to avail itself of this improved highway. The only wagon road Atlantic City has at present is a narrow ribbon of a turnpike, running on the level of the meadows and often rendered impassable by the overflowing tides. Upon this turnpike a trolley line has been constructed, making wagon travel very difficult. This boulevard, when completed, will connect the seashore with about seventy-five miles of fine state and county roads which Atlantic county has been several years building.

The village of Ridgefield Park, in Bergen county, has commenced the construction of Teaneck road, Ridgefield avenue, Hackensack road, Mt. Vernon street, Paulison avenue, Sixth street, Central avenue and Railroad avenue, a total of 3.62 miles.

Burlington county, as in previous years, is clamoring for all the money possible to meet the numerous petitions that have been pre-

sented for State aid. It has in previous years spent the whole amount of the one-fourth of its ratables, and now, under the new Road law, its expenditures are nearly reaching one-half of one per cent. of its ratables. It has completed the construction of the Piper's Corner and Indian Mills road, 4 miles long; Vincentown and Red Lion, 1.61 miles; Crosswicks and Bordentown, 3.19 miles; Chesterfield road, 2.81 miles; Moorestown and Masonville, 3.76 miles; New Gretna road, 8.15 miles; Beverly and Burlington, 2.16 miles, and the remainder of the Burlington and Columbus road, 2.30 miles, all of which when completed will add 27.98 miles to its system of roads, making a total of 169.04 miles built under the provisions of the State Aid law.

Camden county, owing to heavy outlays for other purposes, has not entered very extensively into road construction, but has been content in spending a portion of its money in the purchase of the Camden and Blackwood turnpike, 7.39 miles, and in completing the Stoy's Landing road, .67 miles, and the second section of the Hadonfield and Mt. Ephraim road, 1.44 miles, a total of 9.50 miles. Other roads have been applied for, but the pressure of the State department has been to induce the counties to purchase the toll pikes before any more roads are constructed. Camden is about the only county that contains a considerable number of toll roads, at present having about thirty miles of toll pikes, which we hope to see eliminated before many years.

Cape May county last year, under the State Aid Turnpike law, purchased the Ocean City turnpike, 2.23 miles across the meadows, which it is this year proceeding to improve. The roads completed are the Seashore, 3.86 miles, and the Rio Grande and Holly Beach, 2.34 miles, a total of 6.20 miles. The growing cities along our coast are demanding quite a number of expensive wagon roads across the meadows to connect them with the mainland.

Cumberland county has built the Mauricetown Bridge road, 1.22 miles long. This road extends from Mauricetown to the railroad, across an immense stretch of meadow, which is overflowed by the tides. It gives a short outlet for the inhabitants of Maurice-town to the railroad station. Before the construction of this road the people were forced to travel several miles around to reach the station. This county was slow in taking advantage of the State Aid law, but quite a number of roads are now candidates for improvement under its provisions.

Essex county has improved Dutch lane, 2.59 miles; Grove street, 2.07 miles; Ridgewood avenue, Glen Ridge borough, 1.13 miles, and has under construction Hobart's Gap road, 4 miles, and Swamp road, 5 miles, a total of 14.79 miles built and under construction.

Gloucester county has constructed Main street, Williamstown, 1.77 miles, and has finished the Clayton and Williamstown road, 5.96 miles, a total of 7.73 miles. This is a smaller mileage than that for any previous year.

Hudson county started out to build two expensive roads across the meadows between Jersey City and Newark, but not being able to agree with Essex county upon the kind of pavement that should be used upon the Plank road, the construction was postponed until next year. It has commenced the construction of the other road from the junction of the Newark and New York turnpike to Belleville, called the Belleville turnpike, 2.32 miles long. On account of the heavy floods and numerous accidents, only a very small part will be completed this year. The cost of this construction will be in round numbers about \$54,000. As there is no material along its line, the earth for the embankments necessary to raise it above the tides has to be brought some distance by rail.

Hunterdon county has not as yet entered the list, although there are rumors of petitions being presented.

Mercer county, like Burlington and Essex, has an insatiable appetite for road building. Besides completing the construction of the Marshall's Corner and Woodsville road, 2.43 miles, this county has built the River road, 5.95 miles; Centerville road, 1.97 miles, and the Shabakunk road, 1.95 miles, making a total of 12.30 miles, and has under construction the extension of Scotch road, 1.95 miles; Princeton hill, .70 miles, and the Harbourton road, 1.70 miles, a total of 4.35 miles.

Middlesex county, besides completing the New Brunswick and Bound Brook road, 2.50 miles, and the Sayreville and South Amboy road, 2.25 miles, was an applicant for eight pieces of roads and two pieces to be jointly built by Middlesex and Somerset. Those completed are the Oak Tree and Iselin road, 1.25 miles; New Durham, 1 mile; Plainsboro and Aqueduct, 1.52 miles, and Red Tavern or Applegarth, 1 mile, a total of 4.77 miles. Those under construction, which will not be finished in time to claim this year's appropriation, are the Landing Bridge and New Mar-



Marshall's Corner and Woodsville road, Mercer Co., showing rock fill of 12 feet.



Marshall's Corner and Woodsville road, Mercer Co., after improvement.

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ket road, 1.50 miles; Bridge approach, Ridgeway avenue and Fourth street, 1.25 miles; extension of Sayreville road, 2.53 miles, and the Morristown and Lawrence Harbor road, 2 miles, a total of 7.28 miles, while those approved of for construction in 1904 are the South Amboy and Keyport road, 1 mile; Franklin Park road, 5.74 miles, and the Inter-County road, 1.27 miles, a total of 8.01 miles. These are branch roads to those already built, and extensions of roads that are intended to be trunk lines.

Numerous roads have been approved of in Monmouth county, but the energies of the State and county have been devoted only to the building of the following:

Corliss avenue, 4.47 miles; Second, John, Church and Front streets, Keyport, .78 miles; first section of the Manalapan and Freehold road, 2.92 miles, and the Manasquan and Belmar road, 6.29 miles, a total of 14.46 miles, besides finishing the extension of the Navesink road, 2.32 miles; Ocean avenue, North Long Branch, 1.76 miles, and Main street, Matawan, 1.50 miles.

Morris county completed the Green Village road, 3.40 miles; Newark and Pompton turnpike, .75 miles; Sussex and Newton turnpike, 1.07 miles; first section of the Lincoln Park, Montville and Boonton road, 1.34 miles, and the eastern end of the Randolph township section of Newton turnpike, .57 miles, a total of 7.13 miles, and has under construction the second section of the Lincoln Park, Montville and Boonton road, 2.94 miles, and the remainder of the Randolph township section of Newton turnpike, 3.04 miles, a total of 5.98 miles. On account of the heavy grading on the Randolph township road, progress on this line has been very slow.

Ocean county, although slow to accept State aid, has now eagerly entered the list and has commenced the construction of quite a number of roads. Those finished this year are the first section of the Lakewood road, 3.70 miles, forming an important route between Lakewood and the Atlantic ocean; the first, second and third sections of the Little Egg Harbor Shore road, 5.40 miles, and Sea avenue, West Point Pleasant, .87 miles, a total of 9.97 miles. Work has been commenced on the first and second sections of the Stafford township road, 4.97 miles; Eagleswood Main Shore road, 3.05 miles, and the Ocean Township Shore road, 3.22 miles, a total of 11.24 miles.

Passaic, one of the counties that has most of its leading roads improved, has completed the Squaw Brook road, 1.46 miles; Macopin road, 2.75 miles; Clove road, .88 miles, and East Thirty-first street, 1 mile, a total of 6.09 miles, and has commenced work on the Squirrel Woods road, .60 miles; Barbour street, .44 miles, and the Mountain View and Singac road, 2.47 miles, a total of 3.51 miles. The Paterson and Hamburg turnpike, 3.71 miles, is gradually approaching completion, but owing to the many deep cuts and heavy fills required, and also the unsettled question of the railroad crossing, it could not be completed this year.

Salem county completed the construction of the Elmer and Alloway road, 3.87 miles, and the Salem and Hancock's Bridge road, .74 miles, a total of 4.61 miles, and prepared to build the Salem and Pennsville road, 5.87 miles. Bids for Warren Bitulithic Macadam construction, according to the Warren methods, were asked for this road, but they were so high they were not accepted, and the freeholders may revert back to stone, for which the specifications were first prepared.

Somerset county built the Neshanic road, 6.24 miles long, also joined with Middlesex county in preparing to construct the Franklin Park road, 5.74 miles, and the Inter-County road, 1.27 miles. The latter two roads when completed will form a portion of a continuous line through a very beautiful and fertile agricultural district. When the connecting link of about five miles between the Franklin Park and Inter-County roads is constructed, it will form a direct route from New Brunswick to Trenton, thus connecting the stone road systems of northern New Jersey and the Delaware valley.

Sussex county last year entered into the construction of four roads—the Sussex and Newton, 1.50 miles; Sparta and Newton, 1 mile; Stanhope and Newton, 1.53 miles, and Tuttle's Corner, 1.69 miles, a total of 5.72 miles—and this year has completed the Stanhope and Newton and the Sparta and Newton, while the Tuttle's Corner is unfinished. This county contemplated the construction of nine small sections of roads in different parts, but it only succeeded in obtaining much higher bids than it was willing to spend. The advice of this department has been to first confine their construction to one or two trunk lines, from which much better results would be produced than by building in widely-

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scattered spots. They have very good native limestone and gneiss rock, which enables them to build the stone superstructure very cheaply, but, on account of the numerous hills over which the roads now pass, there will have to be many realignments, or else the grading will be expensive.

Union county has not made any application for stone roads this year. There have been some efforts towards the construction of two township roads, but they have not as yet materialized.

Warren, one of the late counties to take advantage of the State Aid law, has now fully enlisted in the work of road improvement. It has constructed this year the first section of the Danville road, 1.20 miles, the first section of the Stewartsville road, 1.28 miles, and the Straw Church road, 1.46 miles, a total of 3.94 miles. The remaining portions of the Danville road, 3.67 miles, and Stewartsville road, 2.43 miles, were not completed in time to claim this year's appropriation.

Recommendations in our last report that the boards of freeholders should build around instead of over old roads, which are laid over high elevations, have been, in a measure, complied with, thus avoiding some of the numerous steep grades which are encountered in building roads in the mountainous parts of the State.

The Legislature, recognizing the force of the recommendations made in our last report, to the effect that the State Aid law be rewritten, has passed a new Road law which simplifies the old one and reduces its volume.

The new law permits an increase of the state appropriation to \$400,000, and gives the counties the right to assess for road purposes upon their ratables to the extent of one-half of one per cent., exclusive of the State's appropriation, while the old law restricted the amount that could be raised for road improvement to one-quarter of one per cent., inclusive of the amount contributed by the State to any county, thus more than doubling the ability of the counties to build roads. The new law relieves the property-holder from paying the 10 per cent. of the cost, and allows the freeholders instead the privilege of requiring the townships to pay the said 10 per cent. before accepting the petitions. The freeholders can also anticipate the appropriations to be made from the annual tax levy and award contracts at any

time during the year, thus enabling them to prepare for road building during the winter months and begin construction as soon as the weather permits, thus lengthening the road-building season. Formerly many of the most valuable months were wasted in getting ready. The new law also permits more liberal borrowing and lengthens the time of payment, gives the power to the commissioner to withhold the state money from those counties which do not keep their roads in perfect order, which we think will be a strong incentive to cause the roads to receive proper repairs, and simplifies the process of the acquirement of lands. We have often been troubled in getting possession of the requisite amount of land to straighten or widen roadbeds. A separate law has also been passed which still further facilitates the condemnation of lands.

The new law embraces in short paragraphs the amendments to the old law, the privilege of counties improving their boundary lines when they happen to be wagon roads, and extends the provisions of the act to townships, towns, villages, boroughs or any municipality, giving to the governing bodies of these the same powers as are given to the boards of chosen freeholders. So far this law seems to be working very well in practice.

TOLL ROADS.

The few toll roads that are in existence in the State are being gradually absorbed and made into free wagon roads.

In Atlantic county the Atlantic City and Pleasantville road was sold to a trolley company, and iron rails now rest upon its bed.

In Bergen county there is now one stone toll road remaining—the last in northern New Jersey.

In Burlington county there are three gravel toll roads left—two, four and six miles in length.

In Camden county there are four stone toll roads—five and one-half, eight, eight and one-half and six miles in length. The State and county this year bought the Camden and Blackwood gravel road, eleven miles long, and made it a free road.

THE INFLUENCE OF GOOD ROADS.

BY ROBERT A. MEEKER, STATE SUPERVISOR OF ROADS.

The influence of good roads begins with the individual and from this unit extends to the neighborhood, township, county, state and nation.

The founders of our government declared "all men are created equal," but there the equality stops. From earliest infancy we are moulded by the many and various agencies by which we are surrounded. If our daily life is narrow and circumscribed, our minds will necessarily lack breadth, our thoughts will move in a small and perchance crooked channel, and, in consequence, our opinions and motives will be small and selfish and mean. What our fellows think, wish or do will have little influence with us, and we will live for ourselves alone. In other words, we will revert to the primitive or savage state. It is only by contact with others that our faculties are aroused and our senses quickened. Ambition is one of the greatest spurs to our minds, as well as to our bodies. The desire to excel, and thus gain the applause of our fellows, spurs us all. The greater their number, the more potent is this motive. The better the means of communication, the wider becomes the circle of our efforts. We cannot conquer new worlds if we cannot reach them. Hence, our lives, our minds, our ambitions, are one and all influenced by the facilities of communication. This being so, how necessary it is to our progress as individuals and communities that we should have easy and good roads over which to travel.

Good roads quicken our sympathies into acts of charity, and our desires into fruition, by furnishing us with the means by which our bodies may be transported to the places where our minds tell us they should be.

Good roads make the deductions of the philosopher, the dreams of the poet and the plans of the general possible, and thus they one and all become realities. The wonderful tale of the seven league boots becomes a reality on a good, hard road with a bicycle, and is relegated to the commonplace by the daily performance of the automobile.

The railroads have done much for our country, but their usefulness is multiplied a hundred-fold by the good roads leading to the numerous stations along their lines. Of what use is a railroad to a rich farming community if the farmers cannot reach the station? Every railroad man knows that bad roads reduce his profits. For example, he sends a number of empties to a station, and, on their arrival, the local agent informs him that the crop is on the farms and, owing to the bad roads, the farmers cannot get to the station with enough produce to load the cars in two weeks. In the meantime, the locomotives and train crews are scarcely earning enough to pay running expenses; then, when the wagon roads are in good condition, the station platforms are crowded and lines of loaded wagons stand waiting their turn to be unloaded, and at last grow weary of waiting and deposit their produce beside the track, where it remains until it is damaged before it can be moved, thus entailing a loss both to the producer and transporter. Consequently, instead of having a steady, uniform amount of freight, he encounters a series of rush and idle periods. The cars necessary to handle the tonnage in rush times are entirely too many for the traffic in the dull seasons, and he is between the two horns of a dilemma—either he must have a number of idle cars standing in his yard during a greater portion of the year, or he must see his freight tonnage decrease, because the farmers are discouraged from raising large crops by the uncertainty of getting their stuff to market after they have raised it. With good roads this is in a great measure changed, because, when the ground is too wet to till, the farmer can haul his produce to the station, and, if it is too cold or too hot to work, the good road invites him to take his wife and children away to spend the day in getting sunshine to lighten their days of toil.

The combination of the telephone and good roads has raised the question of moving agricultural produce from a very uncertain proposition to one of almost mathematical certainty. The station agent is informed by telegraph that a specific number of cars will be at his station at a certain day. He in turn telephones to the farmers that the cars will be ready for them at that time. They load their wagons with quadruple the weight they carried before they had good roads, and, on the morning of the appointed day, whether wet or dry, drive to the station, load the cars and both

farmer and railroad man go on their way rejoicing. This is the state of freight movement in many parts of New Jersey, and the railroads have come to regard it as the normal condition of crop movement, and are only awakened to a realization of the advantages they derive from good roads when some of their fellow-railroaders, from less favored sections, express surprise and envy at the uniformity of the shipments of the products of the soil. It is the same old story—so long as everything moves along smoothly we do not stop to consider the cause, but accept the good things as our right, and it is only when something goes wrong that we suddenly pause and complain and find fault with everybody and everything.

The growth of New Jersey is due in a great measure to her good roads. These induced occasional visitors from New York, Pennsylvania, New England and other sections of our country to become permanent residents among us. These first comers persuaded their friends and relatives to follow them; thus New Jersey drew the brains, energy and capital of other States within her borders to such an extent that in some towns we find the largest taxpayers are natives of some other State.

It is true our train service is good and our railroads have done much to build up and improve our suburban towns, but how limited these benefits were and how small the local business was until the era of good roads came. Towns that now have forty trains a day each way were thankful for ten, and the railroad officials often discussed the advisability of reducing the number still lower. No one who commuted dared to live more than a mile from the station. Now some enjoy country life five miles away from the railroad, and, barring an occasional blizzard, feel perfectly sure of reaching the station every day in time for their trains. As every new resident along the line means more freight and more money for the railroads, one would naturally suppose that our railway corporations would offer every inducement in their power to aid the cause of good roads, but, strange to say, this is not so. Crushed stone is regarded simply as an article of freight revenue, and not as a producer of new business. Looking at it from the point of view of dollars and cents alone, it would pay the railroads to handle crushed stone for a lower rate than coal, for it is the good stone roads that bring the consumers into our midst,

and thus give the railroads the business that they so earnestly seek.

Good air, good water, good churches, good schools, and good roads, to bring the people to these blessings, will develop any neighborhood. The first two you may have without good roads; the others cannot attain their full degree of usefulness without improved highways.

The statistics compiled by our State Board of Education bear most striking evidence to the benefits conferred upon the schools of our State by the good roads which traverse the districts in which they are located. The increase and regularity of attendance is followed by an awakened interest on the part of both parents and pupils in all educational subjects. New topics for discussion arouse and quicken the minds of the people, and, from a state of almost mental stagnation, they are raised to one of lively interest in the subjects that tend to mental and moral advancement.

How to keep the boy on the farm is a subject that has caused many a parent anxious thought, but with good roads anxiety is changed to complacency, because they have learned that if the boy does go away to the city and is successful, he will come back to the farm to live, at first for the summer, and at last for all the year. If, on the other hand, he is not successful, he is only too happy to return to the parental roof and take up the burden of farm life where he laid it down, finding in driving a good horse over a good road a keener pleasure than he ever experienced in all his city life.

The influence of good roads is like the ripples made by casting a pebble into a lake of still water—it goes on increasing and spreading, awakening all the dormant life into action, until it reaches the uttermost bound, quickening in its course everything animate and inanimate.

Every new mode of locomotion designed for use on our highways arouses public interest in the condition of our roads. The first great general agitation of recent times for good roads was begun by the bicyclists. When a man had to furnish his own motive power he quickly learned how much greater an expenditure of power was required to propel his wheel over rough, soft and uneven roads and up steep hills than over smooth, hard and even ones, with moderate grades. That patient, long-suffering

servant of man, the horse, had tugged and wallowed through mud and panted and pulled up long, steep hills, never protesting until his strength was exhausted. But as man has never been endowed with the patience of the horse, he protested as soon as he was called upon to display the same uncomplaining endurance. Protest after protest was made through the public prints and in the halls of our Legislature, until the matter was taken up by our lawmakers, with the result that New Jersey, though forty-second in area, has to-day twice as many miles of good roads as any State in the Union.

For years it was charged that New Jersey was out of the Union. If it is the bad road union that pervades the United States that is meant, we are only too glad of the opportunity to plead guilty to the charge, for we are not only out of the bad road union, but mean to keep out as long as we can.

WHY WAGON ROADS IN THE UNITED STATES ARE BAD AND HOW THEY CAN BE IMPROVED.

In that part of the country which was first settled the roads were trails or paths which went from the settlements into the wilderness, and naturally went from point to point over the shortest route without regard to hills. They went straight. Later on, horses were ridden, and afterwards driven over these trails, and so the wagon road was made without regard to finding an easy grade, a good surface or drainage.

In the west, the railway was built before the wagon road, and the wagon road was an enlarged path or trail, which led from the farm in a straight line to the railway station. It frequently followed the section line, without regard to hills, swamps, grades or drainage.

It is not surprising that roads made in this manner, without any engineering skill or practical knowledge of road building, were bad when made, and continue to be just as bad at the present time.

This country, if not the richest, is almost the richest, in the world, yet it has the poorest wagon roads of any country in the world.

During the past thirty years there have been built 132,865 miles of steam railway in this country, and we now have 203,133 miles of iron road.

During the past fifteen years we have built 23,134 miles of trolley road, mostly in cities and towns. This trolley road has, by giving quick transit, immensely improved values in cities and towns and in their neighborhood.

Where good roads have been built, farm values have improved, because it is easier to get produce to market, and life is made pleasanter and happier for the owner of the land.

Except where a few States have given aid in building roads, the farmer has had to bear the whole cost of building and maintaining them, although they are much used by the dwellers in cities and towns, who, as a rule, contribute nothing towards their cost or maintenance.

A short review of the good roads movement in some of the leading States of the Union may not be amiss, to emphasize the fact that State aid for the improvement of the public roads is rapidly becoming a fixed and popular policy for the whole nation.

Since State aid began, the States of New Jersey, Connecticut, Massachusetts and New York, and their counties, towns, &c., have spent, or are spending, in money, and built, or have in course of construction, roads as set out in the following table:

	<i>Amount.</i>	<i>Miles Built and Under Contract.</i>
New Jersey	\$4,545,494	959
Connecticut	2,233,000	454
Massachusetts	5,150,923	480
New York	4,135,000	484
	\$16,064,417	2,377

Briefly, below we give a statement showing to what extent the excellent system of State aid has been put in operation:

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NEW JERSEY

Appropriates annually as State aid \$250,000. The State pays one-third of the cost, the counties two-thirds, and 10 per cent. of the counties' share may be assessed on the townships. The State has appropriated during the past ten years \$1,515,168. The counties have spent more than double this sum, as they pay for bridges, surveying and incidentals. There have been built and are now under contract by State aid 959 miles of road, and there are applications made for the improvement of 480 miles of road, for which the State has as yet made no appropriation.

CONNECTICUT

In 1895 appropriated \$150,000 for hardening the public roads; in 1901 and 1902, \$450,000, and, out of 168 towns in the State, 162 towns have applied for State assistance. The total amount requested by these towns was \$230,000 in excess of the appropriation. The State pays two-thirds, and in some instances three-fourths, of the cost of the road. The towns pay the balance of the cost. The State has appropriated the sum of \$1,233,000. The towns and counties during this period have spent for their share a little over \$1,000,000. There have been built and are now under contract by State aid 454 miles of road.

MASSACHUSETTS

Appropriates annually \$490,000 as State aid. The State pays the entire cost of the road, but 25 per cent. of the cost is assessed back to the counties. The State has appropriated for the building of roads \$4,940,000. The Massachusetts Highway Commission has received some contributions from counties, towns and individuals to assist in building roads, which amount to \$210,923. They therefore have expended \$5,150,923 on roads. The State has built and now has under contract 480 miles of highway and has petitions covering 1,120 miles of road, and is awaiting appropriations to build the same.

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NEW YORK

Appropriates \$600,000 a year as State aid. The State pays 50 per cent. of the cost of the road, the counties 35 per cent. and the towns 15 per cent. The State has appropriated, all told, \$2,065,000 for State aid. The counties and towns have spent nearly a like sum; 242 miles of road have been built and 242 miles are now in process of construction. The State Engineer and Surveyor has petitions for 2,300 miles, for which the counties and towns have either appropriated their half of the cost or are ready to appropriate the same, and are waiting for the State to appropriate its share, which will amount to \$9,000,000. If the State does not appropriate more than \$600,000 a year as aid for roads, it will take about fifteen years to complete the roads now petitioned for. Those interested in roads are not willing to wait this long. Therefore, at the last session of the Legislature a constitutional amendment was carried which provides that this State may bond itself for \$5,000,000 a year for ten years—that is, for \$50,000,000, for the building of wagon roads. This amendment must be again passed by the Legislature of 1905 and afterward submitted to a vote of the people. It is believed that in the year 1906 this State will issue bonds for the building of roads.

PENNSYLVANIA

In 1903 provided for the appointment of a State Highway Commission and appropriated \$6,500,000 to be apportioned among the different counties as State aid, in proportion to the mileage of roads in each county, and to be expended during a period of six years. Two-thirds of the cost of the building of roads is to be paid by the State, one-sixth by the county and one-sixth by the township which the improved highways traverse.

MAINE

Pays its towns for the permanent improvement of main roads \$200 each per annum, and for this purpose appropriated \$20,000 during 1903.

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RHODE ISLAND

Appropriated in 1903 \$100,000 for the construction of highways under the direction of the State Board of Public Roads.

NEW HAMPSHIRE

In 1903 appropriated \$10,000 and provided for the appointment of a State Engineer, who shall prepare a highway map of the State and plan a system of continuous main highways. The Legislature also instructed the Governor and Council to prepare a bill for the next general court, which will provide fully for the inauguration of a system of State work and State expenditure in the future construction of highways.

DELAWARE

Has appointed a commission to have charge of the State highway work and provides that the expense of constructing State roads shall be borne equally by the State and the counties interested. The State appropriated \$30,000 a year for two years for this work.

CALIFORNIA

Appropriated \$25,000 in 1903 to continue the work on the State roads.

For the foregoing resume we are indebted to Mr. A. R. Shattuck.

METHODS OF ROAD CONSTRUCTION.

BY JOSHUA DOUGHTY, JR., COUNTY ENGINEER OF SOMERSET.

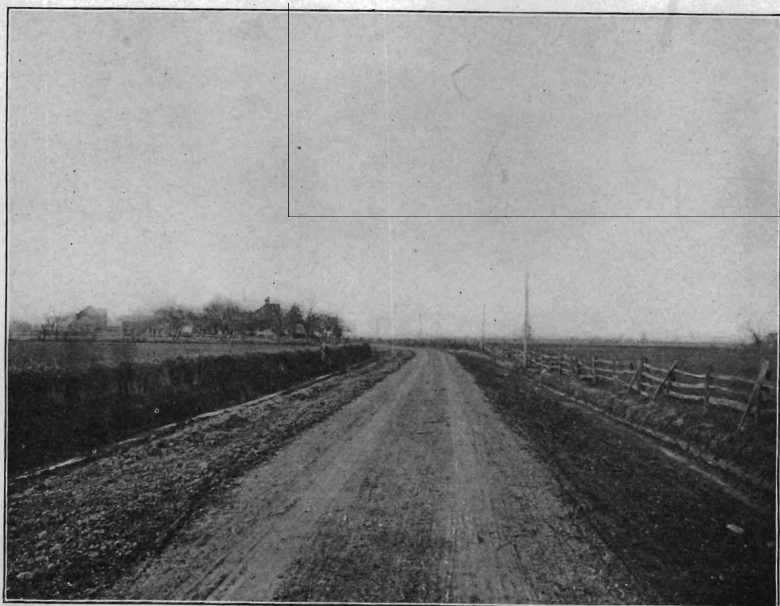
The general subject of road building is too vast and wide to be here considered in all its bearings, especially in view of the many books and articles issuing from the general and engineering press. After, however, an experience of about eight years in the construction of macadam and rock-bottom roads in Somerset county, under the State Aid law, certain features of this work as they present themselves may be of general interest; therefore, we will confine our observations to the following points, namely, the relative merits of simple macadam and of rock-bottom roads in this county, the proper width of macadam for county roads, slag for the foundation and limestone for top dressing.

Given a public highway to be improved, we must ascertain the kind of pavement to be preferred. The proper solution of this question involves a consideration of the nature of the soil, the moisture to be encountered, the future traffic and the expense to be incurred. If a roadbed is so sandy that water will not stand thereon, macadam will be sufficient, but if either clayey or swampy, a foundation of large bottom stones must first be laid, so as to form a rough arch, which will prevent the heavy loads from breaking through the layers of crushed stone. The roads in this county are necessarily of so clayey a nature that, as a matter of fact, a solid substructure of rock is usually required. For example, out of some sixty miles of improved roads in this county, but twelve miles are plain macadam, the other forty-eight being rock bottom.

Whenever much clay is encountered, springs are found either on the sides or in the middle of the stoneway, and are a source of much trouble to the road builder. As clay is unfortunately too often met with, it is more necessary to resort to tiling in the use of macadam than would be the case with rock bottom, as the latter allows the escape of water better than the former. Rock-bottom roads are troubled by springs chiefly when the latter are on hillside slopes, and the water running down from them collects under the roadbed. This, however, may be removed by ditches.



Neshanic road, Somerset Co., before improvement.



Neshanic road, Somerset Co., after improvement.

Too often the cuts for the roads drain basins in the adjoining fields, and this drainage must be taken care of by tiling, which, however, as already intimated, is more imperative for macadam than for rock-bottom roads. Generally speaking, rock-bottom roads are to be preferred, and the prices for roads of both kinds do not greatly differ, depending largely upon the haul. The cost of crushed stone for macadam is about the same as the cost of laying stones for rock-bottom. The heavier the traffic, the more substantially must the road be built. In this county frequent transfers of heavy raw and manufactured materials take place. Macadam, eight inches thick, is heavy enough for all ordinary rural purposes, but loads of from four to six tons in more thickly-settled portions require from ten to twelve inches. The expense depends largely upon the cuts and fills necessary to give the road the proper grades for travel and drainage, macadam and rock-bottom roads costing about the same to grade and nearly the same to build. My preference, all things considered, is the rock-bottom road. Our rock-bottom roads are built of seven inches of rock and five inches of macadam, rolled to six and four inches respectively. Our macadam roads are eight inches in thickness, and my experience is that eight-inch macadam does not withstand winter weather as well as rock-bottom.

In building a rock-bottom road, after the stone has been placed in position it is advisable to use some coarse spalls or tailings on the top of the rock to level up the road. These form good wedges to keep the stones of the foundation in proper position, and, with a little dirt or binder thereon, may be rolled down to a very smooth surface, the whole forming a sort of heavy arch, which is recommended when the macadam is constructed over places naturally wet. Upon this so-called arch may be placed five inches of macadam, the same to be thoroughly bonded, wet and rolled, thus forming an arch of macadam impervious to the water, which will protect the roadbed from moisture and from rain.

As for the width of the stoneway, the majority of our county roads were laid out originally thirty-three feet wide, but we find that these roads are to-day only about twenty or twenty-five feet wide with a wheelway, or that portion used by the traveling public, of not more than ten or twelve feet in width. To widen such roads would necessitate heavy grading along the side banks, and the removal of fences and trees which have in too many cases

encroached upon the roadway, and after completing the work to the required width we find that all the public use is the twelve feet in the center, except during the dry or summer season, when the eleven feet on each side is used for a dirt drive. While it is true that two vehicles cannot pass on a twelve-foot roadway, it is equally true that two vehicles heavily loaded seldom do pass coming from opposite directions in rural districts. Our experience is that, all things considered, twelve feet is wide enough for all country roads, increasing to fourteen feet through the towns. Our first road was constructed sixteen feet in width, but we have since found that not more than ten feet are actually used. None have since been built wider than twelve feet.

In the wheel tracks, small particles and dust are scoured from the macadam and are gradually turned up at the sides of the track, especially the outside. These serve as slight dams to prevent the free passage of the rain-water, and the wider the stoneway the less the chance of escape to the edge of the macadam. Side ditches should be as wide and deep as possible, to make material for fills, but when good, wide side drives are left it is observed that most horses attached to conveyances prefer, during the summer time and pleasant weather, to travel on the side drive rather than upon the hard stoneway. This, however, saves the stoneway and keeps the road in better shape, and, consequently, affords better drainage for the surface-water.

Respecting slag as a foundation, our idea is that it would make a capital foundation for roads, permitting, as it will, the water to percolate freely through the road after an inundation. As an experiment we have used slag to a small extent for bottom layers, but the county roads whereon it was used were constructed so recently that no definite results may so far be noted. This material has been used upon certain streets in Somerville for a foundation for macadam, and after several years' use has proved most satisfactory. Inasmuch as slag is not a weighty material, freights for transportation are much less per cubic yard than for materials of greater weight. Judging from present indications, two or three years' further trial will demonstrate that slag is a very desirable material for the bottom course.

The use of limestone as a binder is in its experimental stage in Somerset county. The results, as determined by these experiments thus far, are as follows:

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Limestone crushes more easily than trap rock under the impact of ordinary traffic, and hence forms a greater quantity of binding material of a very adhesive nature. Where limestone alone is used for the top course, it makes a fine, smooth road for travel for a short time. Five years might be named as the limit of its endurance, while a layer of the same depth of trap rock would last ten years. Yet I have reason to suppose that a judicious use of limestone, in limited quantities, for binding purposes, would be found satisfactory.

MAGNOLIA, NEW JERSEY, November 23d, 1903.

Hon. Henry I. Budd, State Commissioner of Public Roads, Trenton, N. J.:

DEAR SIR—As the fiscal year draws to a close, it becomes our duty to report to you our various enterprises, so generously fostered by our State under your direction.

It is a wise dispensation of our make-up that we are never satisfied with what we have within our grasp, but are striving and pressing forward after new things, even in road construction. The old adage, "There is nothing new under the sun," may be true, but there are many new applications of old principles, and we are trying one in building a road across the salt meadows, between the solid land at Pleasantville and the sand bar on which is located America's greatest seaside resort, Atlantic City.

Two generations ago the idea of a highway over these flats was never entertained. The first railroad charter contemplated a terminus at the west edge of the meadows. It was granted for the Camden and Absecon railroad, which was afterward extended over the more solid portion of the meadow surface to the island of Atlantic City. The railroad ties were laid on the stiff, floating sod, with scarcely any ballast. The storm tides were allowed to ebb and flow over the tracks, frequently interfering with travel for days. The increasing weight of modern locomotives and the uncertainty of the storm tides convinced the railroad management that they must dispense with this floating railroad and have a solid foundation. The latter could only be obtained by an earth fill of sufficient size to displace the soft mud under the sod. This has been accomplished within the last few years, at an enormous expense, even to the railroad company, which owns its equipment for transporting the sand. The county, not owning such equipment, had to devise a new application of the old principle of hydraulic dredging, which has been in use near Atlantic City in land development schemes for years, and with very satisfactory results.

Before we could build a road a right of way had to be obtained. Upon this point a lively controversy sprang up. Many years ago there had been built a corduroy road from Pleasantville to Atlantic City. This structure in reality floated upon the mud, which from time to time settled in places. This necessitated the elevation of the road surface by gravel from the mainland. This method was very expensive, and the toll roadbed had a very doubtful existence until the county and State built the magnificent road from Camden to the meadow shore. This brought thousands of conveyances to the toll road, which now began to pay handsomely, the charge for a double team being sixty cents for the round trip. The value of the toll road appreciated rapidly. The owners did not want to sell a good investment for less than the capitalization on its

earnings, neither did they want a free State and county road as a competitor until they first disposed of the toll road, which was far below the standard required by the public, being submerged by every storm tide. After much discussion the question was finally disposed of by the sale of the toll road to a trolley company. Then all interests were united in securing a parallel right of way and urging a new boulevard on broader lines than could have been developed had the narrow, old toll road been purchased. Routes were quickly surveyed and the most feasible adopted. We were favored in our location by deciding upon a line to the south of the railroad embankment, thereby securing protection from the northeast storm tides. Much of the right of way was cheerfully donated, but, as is always the case, there were some obstructionists. These were quickly overcome by court proceedings, and the public was ceded a right of way one hundred feet wide for one of the most important projects ever attempted in our highway building. Soundings were taken, and we found the mud varied in depth from six to twenty-eight feet, the surface of most of which was a floating sod, varying from two to four feet in thickness, below which was a semi-liquid mud, resting upon hard pan. The latter, in a few places, was only four feet thick. Below this was another almost unfathomable stratum of soft mud. We depended upon the first layer of hard pan to support our structure. It was necessary to pile our bridge approaches. These piles were put down with water jet and hammer combined. At the depth of twenty-eight feet the first resistance was met. At thirty-five feet this was gone, and the pile with weight of hammer sank indefinitely, so we stopped at the depth of about thirty feet. This seemingly bottomless pit extended for only a short distance, and was doubtless the bed of a stream many centuries ago. We usually struck a solid bed of sand, gravel or clay, of various thicknesses, at the depth of from ten to twenty feet below high tide. After locating our road line we built sod banks, five feet six inches high, twelve feet wide at the base and two feet wide at the top, with the growing-grass side out. The inside edges of the sod banks are sixty feet apart. We took the sod for this purpose from between the banks. The enclosed space was afterward filled with pumped sand. We purposely avoided taking sod from the outside, not wishing to weaken the crust, which, in several places, was lifted by the displacement brought about by the settling of the pumped sand. As the sand settled it pushed the mud sideways, until it reached an equilibrium or the sand rested upon the hard pan. The settlement was entirely dependent upon the quantity and density of the underlying mud. As the sand was pumped in the settlement continued. When the bed of sand was six feet above the level of the meadow the weight was sufficient to displace all the mud, and we had a foundation equal to that of the railroads and at a much less cost. Over the salt ponds, where there was no sod for banks, we substituted hard pine bulkheads, at a cost of \$4.50 per lineal foot. After the sand fill was made and thoroughly settled the roadway was given the proper curvature and finished with a coating of gravel. It is hoped that later we will be able to cover it with crushed stone. Both sides of the road are to be protected by a substantial railing. When the whole is complete Atlantic City can boast of the finest driveway in the land, the total contract price for which is less than \$100,000, exclusive of draw bridges.

The sand from the State's riparian lands under the adjoining bay and thoroughfare was pumped through wrought-iron pipes for a distance of one-half mile or more. The sand is mixed with about 90 per cent. of water, which is discharged when required from the end of the pipe, the sand settling and the water running back into the bay. These powerful dredges are revealing the secrets of prehistoric periods. The agitation on the lower end of the suckers

at a depth of about forty feet is breaking red cedar logs into pieces. These are discharged through the pipe with the water and sand, thus clearly demonstrating that this very land was once above the surface of the ocean, long enough to have produced a forest, and was afterward so quickly submerged that the timber did not have time to decay before it was covered with the best-known wood preserver.

This is the last and by far the most expensive link in the great highway across the State from Philadelphia to the sea.

Respectfully submitted,

J. J. ALBERTSON,
Atlantic County Engineer.

THE GENERAL PUBLIC, THE DRAINAGE OF ROADS AND THE ENGINEER.

BY JOSIAH MILLER, COUNTY ENGINEER, SALEM, NEW JERSEY.

In this article it is my intention to call the attention of the general public, the people who use roads and pay for their construction, and who, together with those who follow after them, will forever pay for their maintenance, to one important fact connected with the design and maintenance of a good, serviceable highway without reference to materials or methods of surface construction.

During my experience in road-building I have found that the portion of the work which is of the utmost importance and upon which the lasting qualities of a permanent, satisfactory, and, above all, an economical roadway, depend almost entirely, is the very portion that the general public considers, as a rule, almost entirely unnecessary.

The work to which I have reference is the proper grading of roadways in relation to drainage. The grading in relation to traction, or the power required to move a given load over the surface of a road, is of great importance, but is hardly to be considered in comparison with the problem of drainage.

My experience in road-making has been gained entirely in my own county of Salem, where hills, that seriously affect the tractive power of an ordinary team with an ordinary load, are rare. When the improvement of a road is suggested, the first information voluntarily offered the engineer is, "There ain't no gradin' needed on that road; there ain't no hills nowhere that a team can't pull a load

up easy." You ask about drainage, and a characteristic reply is, "Oh, well, there is a little place there by Tom Jones' where the water lays a little while after it rains, and another little place, t'other side of so-and-so's, and mebbly one or two other little places, but they don't amount to nothin'."

You will usually find that these "little places" that "don't amount to nothin'" have been the prime movers in the application for an improved road, have been the prime factors in the cost of maintenance in the past, and will be the prime factors in the problem to be solved by the engineer when he attempts to design a road that will, at a minimum cost, produce a maximum efficiency.

In comparatively level countries this problem is the most serious one the engineer is called upon to solve, and also the one for which he receives the least credit.

In our county there are comparatively few roads upon which somewhere along the line the engineer's level will not find a place which seems almost impossible to drain without going outside the line of the road, sometimes quite a distance, to find a satisfactory outlet for the accumulated water. Almost invariably where a spot that has been particularly expensive to maintain is pointed out to the engineer, his unaided eye will tell him that accumulated surface water keeps the foundation of the road at that particular place wet, almost to the point of saturation, for quite a length of time after every rainfall. If anyone interested in this matter will take a two-inch cube of soil, dry it thoroughly and then place it in a receptacle containing water, maintained at a constant depth of one-quarter of an inch, he will find that in a few days the cube has settled considerably, and, in course of time, it loses its shape entirely and becomes a mass of mud. Mud on the surface of a road is, to say the least, unpleasant, but mud under the surface is positively ruinous, and will cause the breaking up and destruction of any material thus far found practicable for road-building purposes.

The effect of water upon the surface of a road, while at times a serious problem, can be overcome by various methods of surface construction, but the effect of water upon the foundation can only be overcome by so designing the road that it will be impossible for it to become wet to the point of saturation. Even quicksand, so called, becomes comparatively innocuous when deprived of its moisture, and the black muck of our New Jersey meadows will sustain a respectable load if kept dry. All soils are more or less

like sponges, and have power to absorb or soak up water, due to the amount of their capillary attraction. By this means they become saturated to a certain height above the surface of the surrounding water. The height of this saturation above the water-level depends upon the porosity and other physical characteristics of the soil in question. Keeping these facts before us, it is very easy to realize how a small amount of water, standing along or near to a road, may cause a needlessly large expenditure of money in the maintenance of an apparently well-graded and well-constructed road.

The engineer is in constant conflict with certain laws of nature, and is just as constantly making use of certain other laws to offset the effect of the former, and upon his ability to make use of these laws, and of the education, training and experience he has had along certain lines, depends the measure of his efficiency. In thus using these immutable laws of nature, various methods are, of course, employed. Sometimes they may seem expensive and may be so when first cost alone is considered; at other times they may appear to be comparatively inexpensive, but the expense ultimately incurred is measured by the efficiency of the method employed, and not by its comparative first cost. First cost is important, but the immediate expense of construction comes to an end sooner or later, while the cost of maintenance goes on forever. Therefore, the true measure of expense or economy can only be passed upon intelligently by the general public after time has proven the efficiency or inefficiency of the methods adopted by the engineer.

The engineer's level, when properly handled, is practically infallible, and the deductions drawn by the engineer, after proper use of the instrument, will, if intelligently applied, enable him to design a road that, when finished, will be as nearly perfect, in regard to drainage, as it is possible to build an earthwork structure of this class, and these deductions will also enable him to so construct and necessarily imperfectly-drained portion of the line that the effects of water upon the sub-foundation may be reduced to a minimum, if not entirely neutralized by one or another of the methods at the command of an efficient engineer.

GRAVEL ROADS AND GRAVELS.

BY THEOPHILUS P. PRICE, COUNTY ENGINEER OF OCEAN.

For more than thirty years gravel roads have been built in the shore section of New Jersey. The first constructed would now be lightly esteemed, because of the poor material employed. Gradually, however, the good gravels became known, and the highways began to give excellent satisfaction. One particular piece near Staffordville, in Ocean county, with which unusual care was taken, has stood for twenty years without repair, always in first-class condition.

These roads are important for this section of country, because the solid rock formations are entirely wanting, and, consequently, freights on stone are high, while the gravels stand well since the natural soil is sandy, affording good drainage.

The gravels used contain flint pebbles from the size of a pea to the size of a walnut, and the cementing material is loam, or loam and chert. As the composition varies with every new pit, it is no easy matter to insure a fine road throughout, and while it is acknowledged that the choicest gravels make an ideal roadbed, it is also realized that constant vigilance is necessary to secure the best results.

Perhaps the most helpful way to approach the subject of gravels is to recall the standard stone road. In the years since MacAdam and Telford lived, the principles of the stone road have been well established and many an object lesson is seen near our cities. The bed of sharp, angular stones forms the familiar base. Such stones can be packed, but round marbles will not pack. The same is true of gravels. Flattened, angular flints are preferable if they can be found. On the stone road the cement is powdered rock; in the gravel it is loam, or loam and chert. Care must be exercised to prevent the use of too much loam.

The value of any given gravel depends on these four things, the hardness and toughness of the pebbles, their shape, the proportion of stones to binder or cement and the character of the binding material. As to the first element, the harder and tougher the pebble is, the longer the road will wear, provided the cement is

not washed away too fast and that the pebbles are not too round. In either of these cases a pebble that will crush under the wheels may be better because it supplies new binding material, or furnishes fresh angular surfaces which will the more readily unite, and thus overcome somewhat the other deficiencies of the road. As to the proportion of pebbles, it can hardly be too great, provided the binder is truly tenacious.

When we come to the binding material we have reached the key of successful construction. What makes a good binder? This is not easily answered in a final way. The United States Government is conducting experiments and seeking a scientific answer. As a matter of practical experience and thoughtful observation the following is given: The best loam binder is one in which the clayey cement is very tenacious, and in such small quantity that the gravel will not stick to the shovel enough to bother the workmen. If the gravel with such a binder has a large proportion of pebbles it will make a good road. If, in addition, the gravel also contains chert in an appreciable quantity, that is, from three to ten per cent., it will make a first-class road, perfectly hard all the year around. What is chert? It is flint with a varying percentage of lime, and has the appearance of rotten quartz in the gravel. The chert crushes under the wagon wheels and thus cements the road firmly, and it is not affected by frost like clay. The combination of loam and chert with an abundance of pebbles makes a first-class gravel road.

The cost of our roads during the past year, where the haul was short, was fifty-seven cents per cubic yard for compacted gravel. This price included the cost of the gravel in the bank, which was from four to six cents per cubic yard. When the haul was longer, we had to pay more, in proportion to the distance. As the cost of grading is a fixed sum, whether the gravel be good or poor, and the cost of loading, spreading and rolling is practically a fixed sum, the only difference between the cost of a good or poor gravel is that of the haul after the wagon is loaded; it therefore seldom pays to use an inferior article.

Our roads are graveled twenty feet wide; the depth is nine inches of compact gravel at the center, decreasing to three inches at the outer edge. We find that the roadbed wears better when the outside edge is not crushed down by wagons in turning out, and that it is a great convenience for a light carriage to be able to

pass a loaded team without requiring the latter to move out of the center track.

As our present construction is upon the highway between Lakewood and Atlantic City, with growing towns and villages along the whole route, we regard the above width as necessary to meet the requirements of the traffic.

CONSTRUCTION AND REPAIRS OF MACADAM.

EXTRACTS FROM A PAPER READ BEFORE THE BOSTON SOCIETY OF CIVIL ENGINEERS, BY JAMES H. MACDONALD, CONNECTICUT STATE HIGHWAY COMMISSIONER.

More miles of macadam pavement have been laid than of any other. The simple reason for this is that it is less expensive to construct, although perhaps fully as expensive in the end as any pavement. Macadam is not suitable for general use in cities, and, if laid at all in cities, it should be laid only upon streets without car tracks, for it is almost impossible, with the concentration of travel on the narrow area between the rails and the curb, to maintain a macadam road. Macadam requires close attention for its proper maintenance. It requires a semi-moist, yet firm, foundation; a little shade, not too much. It is destroyed very rapidly by too much watering, but it yields a splendid return for the money invested in its construction when it is properly kept in repair; but, if neglected, no pavement so rapidly disintegrates or is so unpleasant to travel over.

The methods of construction employed vary in different places. It is astonishing that so little is understood about the construction of this pavement. In a very prominent journal a leading editorial recently stated that "it is too bad, where so much money is being expended for macadam construction, that those who have to do with the matter remove themselves so far from MacAdam's methods," and the article expressed a wish that "the people who are in charge of the city pavements would lay a macadam construction such as John MacAdam laid, so that the people may see, for once in their lives before they die, a piece of splendidly-constructed road." No doubt the editor was sincere in his statement, but, had

there been laid upon the streets of his city a macadam road as John MacAdam originally laid it, the editor would have hastened to his sanctum to write an article urging the removal of the officials who gratified his desire. Few laymen are familiar with the fact that MacAdam was denied all of the mechanical appliances we have to-day for crushing the stone, for rolling it, and for other operations in the building of our modern macadam road. Macadam to-day, under proper methods, when it has been accepted by those in authority, is immediately suitable for pleasant, safe and convenient travel, while with MacAdam's roads it took many weeks of constant travel before the rough stone with which the roads were constructed became fit for travel. The great principle employed by MacAdam is followed very closely to-day by men who are in authority over our roads, and the engineers, when they specify a mixed stone method of construction, are as near as possible to the old system or principle inaugurated by MacAdam. In the fracture of the stone with the hammer (the method employed to break stone in John MacAdam's day) a great many small stones were the result. The stones were all used in MacAdam's construction, and the detritus was made by the friction of the wheels on the heavily-loaded wagons passing over the stone, which in time bonded the road, the same as with our dust, water and rolling. The condition of our poor macadam roads is due less to want of knowledge in drawing the specifications than to failure on the part of those who construct the roads to follow those specifications and their contract.

Again, many macadam roads are built from trap-dyke stone, where the action of the elements has moved the stone from the parent ledge, and the stone has become discolored and soft, or the faces of the cubes worn smooth. No amount of rolling, no application of dust or water, will successfully compact and solidify such stone. The process of bonding a road from the top with water and dust is the same process exactly as that employed in the paper-mill. The pulp for making the paper is distributed into the water-run then picked up on to the rough face of the rolls, and, after a series of revolutions over the hot rolls, it comes out through the calender with all the minute particles assembled into paper. The rough face of the stone of a fresh fracture will remove the dust from the water as it works down through the several courses, and will separate every particle from the water by a perfect system of filtrage, if the stone is clean and has a fresh fracture. If the

fracture is old or smooth, the water will go right through all of the courses of stone without relieving itself of any of the particles of dust, and the result is that just a little dust, moistened with water from the sprinkler and pressed down by the roller, is all that remains on the surface to hold the stone together. An examination of the road when just finished will, to the inexperienced eye, suggest that the road is splendidly built. The road may be first class in shoulder construction, solid and unyielding in its foundation, perfect in alignment and in its cross-slope grade, and yet the first team that uses that road will disturb the little covering of screenings and irritate the surface, the wind will quickly remove the top layer or finishing course of screenings, and the whole road will commence to ravel from one end to the other. Such has been my experience on slide trap-dyke stone, and it will be the experience of anyone wherever that class of stone is used, for it is next to an impossibility to hold or bond stone of that class unless it is bedded in cement mortar.

While trap-rock is acknowledged to be the best material, there are so many different varieties of it that the results obtained are not always satisfactory. If a combination of two kinds of trap-rock could be used, one having good wearing qualities and the other the ability to bond, the result would be a fine wearing road, satisfactory and inexpensive to keep in first-class condition. While trap-rock is the very best material for road construction, by reason of its ability to sustain great stress of travel, and having in its constituent parts iron and lime sufficient to properly unite the cubes, I have seen fine roads constructed of granite for the bottom courses of the road, with a trap-bonding and finishing surface. A very fine road can be built of some varieties of granite. I have built some such roads and have seen them exhibit splendid traits of character for public travel. The detritus is formed in sufficient quantity by the travel to keep the road in a fine state of preservation.

The great secret in building a macadam road is in furnishing a bond which will not depend entirely upon screenings to preserve the road in a compact condition. No amount of roller pressure will solidify the road as effectually when it is first built as after it has been used and seasoned by travel. Hence the roads should be built as solid and compact as possible.

Where macadam is laid with no curbing to retain the stone in

the position that it should occupy, it is essential to build a very solid, compact and firm shoulder of the very best material. This very valuable precaution does not receive adequate attention. In the forming of shoulders, the rule with contractors is to line out the road and establish the height of the shoulder, and where shoulders are to be made, to build the shoulder material flush up to the line, instead of allowing the material to go over into the traveled part not less than from eight to ten inches. This gives an opportunity for ramming the shoulders down good and solid and then cutting back to the line, thus forming a good, firm edge to work to. When shoulders are thus made, the metal used in the roadbed is retained in position and does not work out into the shoulders, robbing the road of material that properly belongs to it.

ROLLING MACADAM.

Another wrong method of construction is to roll down the center first and finish up with the side rolling. The first method has a tendency to flatten out the road and to destroy the proper cross-slope grade. When the finished road has been tested by the engineer and found deficient along the center line, only one of two courses is open to the engineer to bring the road up to the established grade—either to disturb the entire surface or to put on an additional quantity of screenings. It is seldom that the first course is resorted to, but too frequently the latter. A road brought up in this way with screenings will always be an object of great solicitude and an expensive road to keep in good repair.

The practice of center rolling has a tendency, also, to leave the outer edges and three or four feet of the macadam very loose in their construction, while the center, when the road is first turned over for travel, is the best part of the road, which, by use, in a short time breaks its bond and works out towards the sides, and then trouble commences. In building macadam or any other pavement there are no little things, from the ploughing up of the road to the last rolling the road receives. Very much depends even on the dumping of the load of metal in the roadbed. Under no consideration whatever should a load of stone be allowed to be dumped on the roadbed proper unless every part of the load, before rolling, is removed and placed with shovels in the place it is to

occupy, for the simple reason that, when dumping is resorted to, whether from a cart or from a reach-wagon, uniform roller pressure cannot be had upon all parts. The part which is brought to the established grade by shovels will respond to the rolling, but where the body of the stone fell there will be resistance, which, in time, will develop a weakness in the road. Every part of the road should receive equally the same amount of roller pressure. Every part of the road is dependent upon every other part, just as the smallest rivet in a Corliss machine is as important as the great wheel that moves the belt to turn the wheels in the entire factory. In road construction, if the simplest detail is neglected the result is fatal to the road; so the utmost care must be taken in every step of construction if we are to have first-class work.

TELFORD.

I have used telford only in special cases, where the foundation was uncertain. A *thirteen-inch telford road* will not wear as well as a *seven-inch macadam road* upon a gravel or mixed earth or sand foundation. The rigidity of the thirteen-inch pavement conduces to the destruction of the road, while the elasticity of the foundation of a seven-inch macadam tends to its preservation; so I have not extended the system of telford roads any further than was absolutely necessary, preferring to use good sub-grade material, with plenty of rolling, and to extend my system of macadam at a less price than if my roads had all been of telford construction.

It would be difficult to outline any method of highway improvement to be rigidly followed by every town, every county and every State in the Union. No standard work in print to-day will equip the engineer with that degree of information necessary to treat every condition of road construction by which he may be confronted. Conditions change, in climate, in the material to be used, in accessibility to railroad facilities, and in a thousand and one things which do not always appear to the man who writes the text-book. Text-books are necessarily written from the point of view, the experience and the conditions surrounding the author. While he may adapt himself to those conditions, every engineer, in taking up this great question, will find that every day is a develop-

ment, every day a going to school. New features are continually requiring his most careful thought and consideration. What he might outline as the proper thing to be done in one place would not be right treatment in another. In some of our States the low-lying plain predominates; in others there is a preponderance of stone. The coast line suggests one character of road, the valleys another, and the mountainous parts of the State another. In one is found plenty of stone, remote from railroads and from a crushing plant, while in another State no stone is to be found, but plenty of gravel is to be had on every side. In still another State we find the sand plain, with neither stone nor gravel. In some places a heavy depth of clay is found everywhere. In Kansas we have seven feet of solid black loam, with no stone. In California many parts of the State are all sand. All these require different methods of construction. Often an engineer finds himself embarrassed by lack of money. A good rule is to lay that class of road that will most nearly meet the conditions obtaining in that immediate vicinity. It is always unwise to import material, or to establish a method of construction that will overburden the people financially to extend it or to keep it in proper repair. In districts with very little stone, and in towns remote from railroads, where plenty of stone is to be found, but no crushing facilities, it is well to lay gravel roads, if gravel is obtainable. I have also found it wise to anticipate the system of general grade reduction in Connecticut, lifting up the levels, straightening the roads, removing the rocks from the roadbeds, and familiarizing the people as quickly as possible with good roads, pending the future general improvement. This plan gives to the people the immediate use of the road and safe travel to their nearest market.

In repairing or maintaining a macadam road it is unwise to put on screenings, for, if a macadam road is properly built, there is no necessity for the application of screenings. Screenings placed upon an old macadam road must lie upon the top of the road, where in dry weather it is dust and in wet weather it is mud. The time to repair a macadam road is when the stones begin to show bare, when the screenings or wearing surface of the road has been lost. Then, instead of screenings, stone ranging in size from one-half inch to three-fourths inch, longest diameter, should be used. If the three-fourths inch stones are spread upon the surface of the road, over the full width of the traveled part and to the depth of

about three-fourths inch (no greater depth should be applied) they will not need water or rolling. The point of contact will be so near the point of resistance that the full crushing force of the hoof or the weight of the load upon the wheel will fracture the stone. The fracture will yield just a small amount of dust, or detritus, which falls quickly to the under surface and is protected from the heat of the sun so that it will not dry out, and from the wind so that it cannot blow off. In a very short time the ordinary travel will reduce all of this course and a gradual healing process will go on over the entire surface. I have tried this method in Connecticut, and have not found a single failure. It yields a very large return for the money invested. But if a road has broken up, there is only one thing to do, and that is to apply whatever stone is necessary, and, of course, go through the process of screening, wetting and rolling. It is never necessary to put picks upon steam rollers and pick up a whole macadam surface, for the simple reason that no macadam road should be allowed to get into such a condition under an intelligent system of repairs.

Dust applied upon a heavy grade would be quickly washed off into the gutters, and all that would be left would be the small particles of stone contained in dust. The weight of the stone would help to resist the force of the elements, and insure some return for money invested in its application.

The minimum grade that we have adopted in Connecticut for gutters on gravel roads is one per cent. Earth gutters do not carry the water very quickly. Under certain conditions we have been forced to allow a less per cent. of grade, but it is always under protest.

GRAVEL.

We have used screened gravel in Connecticut but only once in my whole official career, and I think it safe to say it will never occur again. The screening of the gravel has a tendency to remove its bonding property. Gravel must have, as a constituent part, a sufficient bond, or it is a waste of money to apply it. It is true that we do not find in every place suitable gravel for building gravel roads. We often have to use gravel deficient, especially in bond, and such gravel must be given an admixture of clay or sub-soil. Only that gravel should be used which requires a pick to dis-

lodge from the bank. Gravel which is solid and compact in the bank, free from stratifications of sand, is very generally a safe gravel to put upon the road. It is the policy of my State to use the material found in the town so far as it is possible and economical to use it. We do not import material if we find suitable material in the town. So the building of gravel roads has become a part of our State system. For inter-town roads I prefer a good gravel road. It is inexpensive to construct, it does not require expensive machinery or scientific road-builders, and it is very easily and economically kept in repair. It is a cool road in summer to drive over, and it is not unpleasantly loose in its character in the late fall and early spring. As a rule, it is a good, serviceable road for all seasons of the year, when it is built well and of suitable gravel.

ROAD SCRAPER.

I think the very best tool to use upon an earth road is a road scraper, although I regret to see the use of the plough becoming a lost art. The road scraper may be so handled as to put back upon the road the gutter-wash and wornout material, making it do service over again where it has already been used too long. It is the abuse of the road scraper, and not its use, which is to be condemned. I know of no other tool with which so much work can be done for so little money as with a road scraper when intelligently used.

The standard maximum grade in our State is five per cent., but in some parts we are compelled to exceed this in order to avoid excessive expense. In other words, we accomplish just as much grade reduction as it is possible to get.

The standard depth for macadam in our State is seven inches. The first course is four inches; the second, two inches, and the last, or finishing course, one inch. Where the material is springy on the line of the proposed highway, we furnish a telford base of eight inches and a macadam top of five inches, making thirteen inches over all. On a gravel foundation we have used a five-inch treatment, four inches of macadam and one inch of bonding and wearing surface. Upon some of our roads we have used a foundation of slag, with a two-inch treatment of crushed stone and one inch of screenings, making a very good road.

THE USE OF CONCRETE IN THE CONSTRUCTION OF BRIDGES.

BY C. C. LAPIERRE, DELIVERED BEFORE THE SECOND ANNUAL CONVENTION OF THE EASTERN ONTARIO GOOD ROADS ASSOCIATION.

The use of Portland cement concrete is fast replacing lumber in the construction of bridges throughout the country, as is evidenced by the remarks of previous speakers.

Concrete is to-day looked upon as the most desirable building material, its great durability, when properly made of good materials, being one of its many advantages. In many respects it is superior to masonry, requiring as it does no repointing from year to year. Again, the cost of concrete in the building of bridge piers has been found to be cheaper than masonry. In bridge building concrete is used in several ways. At times solid concrete arches are built, in which expanded metal is embedded. This form of construction has been found very satisfactory, also, for large culverts, where a tile pipe is found insufficient.

Bridge piers and abutments are being very extensively built of concrete, and in most cases a flooring of concrete is placed upon the girders.

The great strength of concrete for flooring was recently demonstrated by the city engineer of Baltimore, Maryland, who made tests to ascertain the breaking strain of a slab of concrete six inches thick. It was found that a floor of this thickness stood a load of twenty-eight tons before giving away. Another test was made of a four-inch floor, which broke at twenty tons. The concrete in both cases was composed of one part of Portland cement, three parts of sand and five parts of broken stone, and was reinforced with expanded metal.

To obtain the best results with concrete it is necessary to observe a few general rules, the most important being to use only clean, sharp sand. The stone should also be free from loam. The water should be clean and never taken from stagnant pools. By observing these precautions good concrete is easily obtained.

It is advisable, when using cement, to buy only the highest grades. The cheap grades are mostly natural cements, and will not carry the same quantity of sand as the higher grades, and the results are very often unsatisfactory, the work having frequently to be done over.

COMMISSIONER OF PUBLIC ROADS.

QUARRIES IN NEW JERSEY PRODUCING ROAD METAL.

BERGEN COUNTY.

<i>Location of Quarry.</i>	<i>Owners.</i>	<i>P. O. Address.</i>
Edgewater	Cody Bros.	Edgewater, N. J.
Linwood	Carpenter Bros.	Linwood, N. J.
Shady Side.....	Brown & Fleming.....	Englewood, N. J.
Fairview	Fairview Stone Crushing Co..	1996 Chambers St., N. Y.

ESSEX COUNTY.

Montclair	Osborne & Marcellis.....	Upper Montclair, N. J.
Montclair	F. J. Marley.....	Little Falls, N. J.
Orange	Geo. Spottswood & Co.....	Orange, N. J.
Millburn	G. A. Lighthipe & Son.....	Millburn, N. J.
Cedar Grove.....	F. J. Marley.....	Little Falls, N. J.
Montclair	Francisco Bros.	Orange, N. J.
Short Hills.....	Stewart Hartshorn	Orange, N. J.
Caldwell	P. A. Matthews.....	Caldwell, N. J.

HUDSON COUNTY.

Bergen Hill.....	B. M. & J. F. Shanley.....	Newark, N. J.
Palisades	Palisade Construction Co., No. 1 Montgomery St., Jersey City, N. J.	
Palisades	Hudson County Contracting Co., No. 367 Communipaw Ave., Jersey City, N. J.	
Guttenberg	Meeks	Guttenberg, N. J.
Granton	Wagner & Duff.....	Granton, N. J.
Granton	F. J. Marley.....	Little Falls, N. J.
Woodcliff	John S. Lane & Sons.....	Guttenberg, N. J.
Shady Side.....	Bull's Ferry Land Co.....	Guttenberg, N. J.

HUNTERDON COUNTY.

Byram Station.....	B. M. & J. F. Shanley.....	Newark, N. J.
Byram Station.....	Trenton Stone and Construction Co.....	Trenton, N. J.
Lambertville	W. N. Ireland, Agent.....	1241 Filbert St., Phila, Pa.
Middle Valley.....	Middle Valley Trap Rock Co.....	Middle Valley, N. J.

MERCER COUNTY.

Moores	Delaware River Quarry and Construction Co., Lambertville, N. J.	
Goat Hill.....	B. M. & J. F. Shanley.....	Jersey City, N. J.
Hopewell	Hopewell Quarry Co.....	Hopewell, N. J.
Titusville	Trenton Stone and Construction Co.....	Trenton, N. J.
Belmont	Mercer County Workhouse.....	Trenton, N. J.

MORRIS COUNTY.

Nearly all road-building material in this county is of native rock, gneiss, granite and shale. The traps are mostly imported from other counties.

<i>Location of Quarry.</i>	<i>Owners.</i>	<i>P. O. Address.</i>
Millington	Morris County Crushed Stone Co....	Morristown, N. J.
Mountain View.....	Standard Paving Co.....	Mountain View, N. J.

PASSAIC COUNTY.

Garret Mountain....	Francisco Bros.	Little Falls, N. J.
Paterson	F. J. Marley.....	Little Falls, N. J.
Paterson	Paterson Crushed Stone Co.....	Paterson, N. J.
Paterson	New Jersey Stone Co.....	Rutherford, N. J.
Paterson	McKiernan & Bergen.....	Paterson, N. J.
Notch Road.....	F. J. Marley.....	Little Falls, N. J.
Notch Road.....	Dowling Construction Co.....	Paterson, N. J.
Haledon	R. M. Torbet.....	Haledon, N. J.
Hawthorne	Daniel & D. Stanley.....	Hawthorne, N. J.
Preakness	Colfax & Steele.....	Pompton, N. J.
Great Notch.....	Wright & Lindsley.....	Orange, N. J.
Paterson	Preakness Stone Crushing Co.....	Paterson, N. J.

SOMERSET COUNTY.

Dunellen	Garrison & Gray.....	Dunellen, N. J.
North Plainfield.....	N. B. Smalley.....	Plainfield, N. J.
Bernardsville	Somerset Stone Crushing Co.....	Bernardsville, N. J.
Mine Brook.....	James Freeman.....	Mine Brook, N. J.
Plainfield	J. H. Wilson & Co.....	Plainfield, N. J.
Millington	Millington Stone Co.....	Millington, N. J.
Chimney Rock.....	Bound Brook Crushed Stone Co....	Bound Brook, N. J.
Somerville	William Hardgrove.....	Somerville, N. J.
Rocky Hill.....	Rocky Hill Stone Storage Co.....	Rocky Hill, N. J.
Bernardsville	Frank S. Tainter.....	Morristown, N. J.
Far Hills.....	Grant Schley.....	Far Hills, N. J.
Bernardsville	Mine Brook Stone Co.....	Bernardsville, N. J.

SUSSEX COUNTY.

Newton	Newton State Quarry.....	Newton, N. J.
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UNION COUNTY.

Scotch Plains	Hatfield & Weldon.....	Scotch Plains, N. J.
Murray Hill.....	Commonwealth Company.....	Murray Hill, N. J.
Summit	A. A. Potter.....	Summit, N. J.
West Summit.....	Victor G. Smythe.....	West Summit, N. J.
Springfield	Stewart Hartshorn.....	Springfield, N. J.

COMMISSIONER OF PUBLIC ROADS. 101

GRAVEL PITS IN NEW JERSEY USED FOR ROAD BUILDING.

ATLANTIC COUNTY.

<i>Location of Pits.</i>	<i>Owners.</i>	<i>P. O. Address.</i>
May's Landing	Estate of Wm. Post	May's Landing, N. J.
May's Landing	D. E. Izard	May's Landing, N. J.
Estelville	A. E. Bourgeois	Estelville, N. J.
Tuckahoe	Henry D. & Wm. G. Moore, Haddonfield, and 931 Chestnut St., Phila., Pa.	
May's Landing	J. E. P. Abbott	May's Landing, N. J.
May's Landing	Samuel Champion	May's Landing, N. J.
Pleasantville	West Jersey and Seashore Railroad	Camden, N. J.
Pleasantville	P. & A. C. Railroad	Pleasantville, N. J.

BURLINGTON COUNTY.

Riverton	Lewis Connor	Riverton, N. J.
Westfield	Enoch Evans	Westfield, N. J.
Westfield	Estate of Wm. R. Lippincott	Westfield, N. J.
Palmyra	Isaac Evaul	Palmyra, N. J.
Palmyra	Wm. F. Morgan	Palmyra, N. J.
Burlington	Frank Warren	Burlington, N. J.
Riverton	Franklin T. Hunter	Riverton, N. J.
Bridgeboro	Edwin M. Brock	Bridgeboro, N. J.
Moorestown	Michael Flynn	Moorestown, N. J.
Hartford	John Warrick	Hartford, N. J.
Rancocas	James W. Stokes	Rancocas, N. J.
Columbus	Thomas A. Bunting	Columbus, N. J.
Columbus	Thomas H. Rogers	Columbus, N. J.
Kinkora	C. G. Kinsley	Kinkora, N. J.
Columbus	Edward Wilson	Columbus, N. J.
Columbus	Charles Sharp	Columbus, N. J.
Florence	George Bowne	Florence, N. J.
Georgetown	John B. Hutchinson	Georgetown, N. J.
Jobstown	Charles Black	Jobstown, N. J.
Centerton	Allen Austin	Centerton, N. J.
Willingboro	Mrs. John Buzby	Willingboro, N. J.
Beverly	J. H. Comb	Beverly, N. J.
Burlington	Samuel Johnson	Burlington, N. J.
Beverly	William Baggs	Beverly, N. J.
Beverly	Joshua Fenimore	Beverly, N. J.
Moorestown	Samuel C. Decou	Moorestown, N. J.

CAPE MAY COUNTY.

Belle Plain	West Jersey and Seashore Railroad	Camden, N. J.
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TENTH ANNUAL REPORT.

CUMBERLAND COUNTY.

<i>Location of Pits.</i>	<i>Owners.</i>	<i>P. O. Address.</i>
Millville	John Golder.....	Millville, N. J.

MIDDLESEX COUNTY.

Old Bridge.....	I. Biddle Herbert.....	Old Bridge, N. J.
Helmetta	Geo. W. Helme.....	Helmetta, N. J.
Jamesburg	James Buckelew's Sons.....	Jamesburg, N. J.
Englishtown	Charles Hoffman.....	Englishtown, N. J.

MONMOUTH COUNTY.

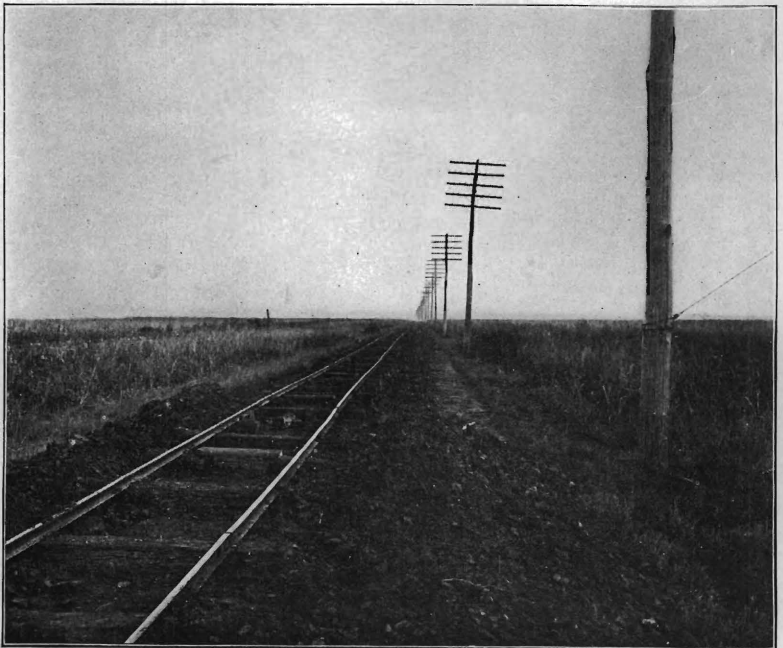
Hopping	D. G. Campbell.....	Middletown, N. J.
Navesink	D. R. G. Andrews.....	Navesink, N. J.
Hopping	Peter L. Conover.....	Atlantic Highlands, N. J.
Leonardville	John T. Hopping.....	Leonardville, N. J.
Red Bank.....	Mrs. Henry Field.....	Red Bank, N. J.
Red Bank.....	James Hubbard.....	Red Bank, N. J.
Red Bank.....	John L. Applegate.....	Red Bank, N. J.
Chapel Hill.....	Geo. T. Hopping.....	Chapel Hill, N. J.
Middletown	J. D. Conover.....	Middletown, N. J.
Farmingdale	Manasquan Gravel Co.....	Asbury Park, N. J.
Allenwood	Manasquan Gravel Co.....	Asbury Park, N. J.
Shark River.....	Manasquan Gravel Co.....	Asbury Park, N. J.
Navesink	Webster Swan.....	Navesink, N. J.
Holmdel	William Crawford.....	Holmdel, N. J.
Red Bank.....	Red Bank Gravel Co.....	Red Bank, N. J.

OCEAN COUNTY.

Stafford	Staffordville Gravel Co.....	Staffordville, N. J.
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Excavation on Belleville turnpike, Bergen Co. This is where we are getting our filling. Showing the steam shovel and engine for hoisting the cars from the bottom of the hill.



Manner of filling on Belleville turnpike, Bergen Co. This is the second section near the railroad track, about one mile below the starting point.

COMMISSIONER OF PUBLIC ROADS. 103

STATEMENTS BY ENGINEERS AND SUPERVISORS.

MAGNOLIA, N. J., November 11th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Absecon and Chestnut Neck road, township of Galloway and city of Absecon, county of Atlantic, State of New Jersey.

Total length, 57,743.1 feet, or, 10.93 miles.

Total width, 14 feet of gravel.

Committee expenses	\$113 47
Gravel purchased in the bank.....	1,167 31
Land purchased to straighten road.....	98 50
Extra work straightening road.....	200 86
Advertising	10 53
Legal expenses	44 80
Preparation of road-bed (cost).....	4,837 29
Open ditches, 412 cubic yards, at 12 cents; total.....	49 44
Stripping gravel pits, 10,784.80 cubic yards, at 20 cents; total....	2,156 96
Gravel, 17,850.25 cubic yards, at 28 cents; total.....	4,998 07
Earth excavation, 7,836.27 cubic yards, at 18 cents; total.....	1,410 53
Overhauls, 6,589.30 cubic yards, at 20 cents; total.....	1,317 86
Overhauls, 1,762.25 cubic yards, at 40 cents; total.....	704 90
Overhauls, 358.05 cubic yards, at 60 cents; total.....	214 83
Supervisor's salary	930 00
Engineering expenses	730 21
 Total	 \$18,985 56

Maximum grade before..... 5.60 per cent.
 Maximum grade after..... 3.93 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches in center and 6 inches on edge.

Respectfully yours,

J. J. ALBERTSON,
Atlantic County Engineer.

H. W. BREDER,
Supervisor.

November 20th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find a detailed statement of the value of work done on the Pleasantville and Atlantic City road, county of Atlantic, State of New Jersey.

TENTH ANNUAL REPORT.

Sand pumped, 109,639 cubic yards, at 18 cents; total.....	\$19,735 02
Bulkhead, 1,193.926 feet, at \$4.50 per foot; total.....	5,372 67
Trestle, 1,096.25 feet, at \$6.25 per foot; total.....	6,851 56
Supervisor's salary	753 00
Engineering expenses	541 36
Condemnation proceedings (right of way).....	472 83
Committee expenses	77 20
Advertising	55 83
<hr/>	
Total cost to date.....	\$33,859 47

Respectfully submitted,

J. J. ALBERTSON,
County Engineer.

W. H. BURGESS,
Supervisor.

November 3d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Crosswicks and Bordentown road, township of Chesterfield, county of Burlington, State of New Jersey.

Total length, 16,820 feet, or 3.19 miles.

Width of stone-bed, 12 feet.

Length of stone-bed, 16,820 feet.

Depth of stone-bed, 6 inches.

Macadam, 22,422.4 square yards, at 85 cents; total.....	\$19,059 04
Telford, 500 square yards, at 75 cents; total.....	375 00
Drain, 2,461 lineal feet, at 18 cents; total.....	442 98
Supervisor's salary	267 00
Engineering expenses	401 26
<hr/>	
Total	\$20,445 28
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Lump sum, contract price.....	\$19,765 54

Maximum grade before..... 3.0 per cent.

Maximum grade after..... 2.7 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

JOHN H. HUTCHINSON,
Engineer.

CHARLES E. WOODWARD,
Supervisor.

COMMISSIONER OF PUBLIC ROADS. 105

November 3d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Chesterfield road, township of Chesterfield, county of Burlington, State of New Jersey.

- Total length, 14,836 feet, or 2.81 miles.
- Width of stone-bed, 12 feet.
- Length of stone-bed, 14,836 feet.
- Depth of stone-bed, 6 inches.

Macadam, 19,775.36 square yards, at 85 cents; total.....	\$16,809 06
Drain, 1,808 lineal feet, at 18 cents; total.....	325 44
Supervisor's salary	207 00
Engineering expenses	342 69
	\$17,684 19
Total	
Lump sum, contract price.....	\$17,432 15

Maximum grade before.....	2.4 per cent.
Maximum grade after.....	2.1 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was not less than 6 inches.

Respectfully yours,

JOHN H. HUTCHINSON,
Engineer.

CHARLES E. WOODWARD,
Supervisor.

November 23d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Vincetown and Red Lion road, township of Southampton, county of Burlington, State of New Jersey.

- Total length, 8,500 feet, or 1.61 miles.
- Width of stone-bed, 12 feet.
- Length of stone-bed, 8,500 feet.
- Depth of stone-bed, 6 inches.

Total cost	\$11,202 00
Lump sum, contract price.....	\$11,202 00
Maximum grade before.....	5 per cent.
Maximum grade after.....	2 per cent.

TENTH ANNUAL REPORT.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

FRANK EARL,

Engineer.

E. EUGENE ANTRIM,

Supervisor.

November 4th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an estimated statement of the cost of the Moorestown and Masonville road, townships of Chester and Mount Laurel, county of Burlington, State of New Jersey.

Total length, 19,855 feet, or 3.76 miles.

Width of stone-bed, 8 feet on each side of trolley track, 5,100 feet; 16 feet wide roadbed in center, 14,755 feet.

Length of stone-bed (estimated), 19,855 feet.

Depth of stone-bed, wings along trolley, 6 inches; roadbed in center, 8 inches.

Preparation of roadbed (cost), at expense of contractor and townships	\$50 00
Macadam, 9,066 2/3 square yards, at 75 cents; total.....	6,800 00
Macadam, 19,673 1/3 square yards, at 97 cents; total.....	19,083 13
Extra paving (estimated), 600 square yards, at 97 cents; total....	582 00
Supervisor's salary	450 00
Engineering expenses	529 04
Total	\$27,494 17

Lump sum, contract price..... \$26,452 31

Maximum grade before..... 3.4 per cent.

Maximum grade after (except where it passes under trolley).... 2 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 and 8 inches.

Respectfully yours,

WM. R. LIPPINCOTT,

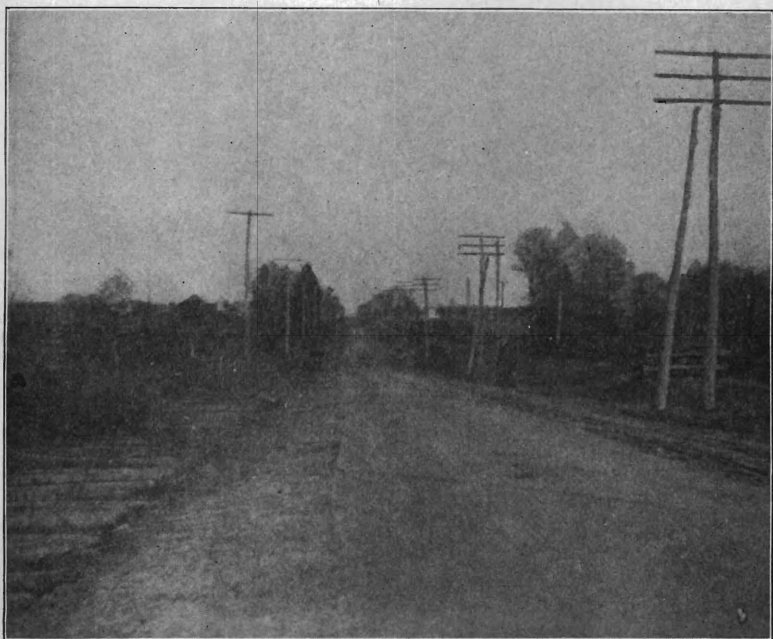
Engineer.

W. P. LIPPINCOTT,

Supervisor.



Moorestown and Masonville road, Burlington Co., before improvement.



Moorestown and Masonville road, Burlington Co., after improvement.

COMMISSIONER OF PUBLIC ROADS. 107

October 29th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the New Gretna road, township of Bass River, county of Burlington, State of New Jersey.

Total length, 43,031 feet, or 8.15 miles.
 Width of gravel-bed, 14 and 16 feet.
 Length of gravel-bed, 43,031 feet.
 Depth of gravel-bed, 6 inches.

Grubbing, 21 acres, at \$10; total.....	\$210 00
Grubbing, 12 acres, at \$12; total.....	144 00
Gravel purchased in bank.....	386 50
Gravel, 7,730 5/27 cubic yards, at 26 to 50 cents; total.....	2,272 96
Gravel, 3,914 4/9 cubic yards, at 26 cents; total.....	1,017 76
Earth excavation, 8,516 cubic yards, at 15 cents; total.....	1,277 40
Earth excavation, 5,140 4/9 cubic yards, at 14 cents; total.....	719 66
Stripping, 4,993 1/3 cubic yards, at 10 cents; total.....	499 33
Supervisor's salary	618 00
Engineering expenses	295 57
	<hr/>
Total	\$7,441 18

Maximum grade before..... Practically level.
 Maximum grade after..... Practically level.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

JAMES WILLS,

Engineer.

WILLIAM T. CRAMER,

Supervisor.

BEVERLY, N. J., November 21st, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Beverly and Burlington road, townships of Beverly and Burlington, county of Burlington, State of New Jersey.

Total length, 11,391 feet, or 2.16 miles.
 Width of stone-bed, 14 feet.
 Length of stone-bed, 11,391 feet.
 Depth of stone-bed, macadam, 6 inches; telford, 12 inches.

TENTH ANNUAL REPORT.

Macadam, 17,353.21 square yards.....	
Telford, 806.20 square yards.....	
Earth excavation, 5,063 cubic yards.....	
Total cost	\$15,691 62
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Lump sum, contract price.....	\$15,691 62

We hereby certify the above statement to be correct, and that the pavement is being constructed strictly according to the specifications, and that the depth of finished pavement will be 6 inches.

Respectfully yours,

CHAS. STOKES,
Engineer.

WM. B. SHEDAKER,
Supervisor.

October 29th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Piper's Corner and Indian Mills road, township of Shamong, county of Burlington, State of New Jersey.

- Total length, 21,100 feet, or 4 miles.
- Width of stone-bed, 10 and 14 feet.
- Length of stone-bed, 23,100 feet.
- Depth of stone-bed, 5 and 6 inches.

Preparation of roadbed (cost).....	\$231 00
Gravel purchased in bank.....	251 36
Gravel, 4,747 6/27 square yards, at 30 cents and \$1.38; total.....	3,804 36
Earth excavation, 7,797 20/27 cubic yards, at 12 cents; total.....	935 73
Stripping, 5,007 10/27 cubic yards, at 12 cents.....	600 88
Supervisor's salary	261 00
Engineering expenses	292 70

Total..... \$6,377 03

Maximum grade before..... 4 per cent.
Maximum grade after..... 3½ per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 5 and 6 inches.

Respectfully yours,

JAMES WILLS,
Engineer.

COMMISSIONER OF PUBLIC ROADS. 109

November 5th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Columbus and Burlington road, townships of Mansfield, Florence and Burlington, and Burlington city, county of Burlington, State of New Jersey.

- Total length, 36,995 feet, or 7 miles.
- Width of stone-bed, 14 feet in Burlington city and Columbus; elsewhere, 10 feet.
- Length of stone-bed, 36,995 feet.
- Depth of stone-bed, 6 inches.

Contract price	\$34,900 00
Extra macadam, 127 square yards, at 80 cents; total.....	101 30
Contract macadam, 42,960 square yards.....	
Total macadam, 43,087 square yards.....	
Earth excavation, 7,700 cubic yards.....	
Extra drain, 637 lineal feet, at 10 cents.....	63 70
Contract drain, 5,000 lineal feet.....	
Total drain, 5,637 lineal feet.....	
Supervisor's salary	882 00
Engineering expenses	701 31
	<hr/>
Total.....	\$36,648 61

Lump sum, contract price..... \$34,900 00

Maximum grade before..... 6.7 per cent.
 Maximum grade after..... 3.8 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

HENRY S. HAINES,
Engineer.

ROBERT TAYLOR,
Supervisor.

MAGNOLIA, N. J., November 17th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an estimated detailed statement of the cost of the Haddonfield and Mount Ephraim road, townships of Centre and Haddon, county of Camden, State of New Jersey.

- Total length, 7,572 feet, or 1.43 miles.
- Width of stone-bed, 15 feet.
- Length of stone-bed, 7,428.9 feet.
- Depth of stone-bed, 8 inches.

TENTH ANNUAL REPORT.

Preparation of roadbed (cost).....	\$443 33
Macadam, including wings, 12,431.5 square yards, at 95 cents; total,	11,809 92
Earth excavation, 1,210 cubic yards, at 25 cents; total.....	302 50
Supervisor's salary (estimated).....	480 00
Engineering expenses	391 17
	<hr/>
Total.....	\$13,426 92

Lump sum, contract price, exclusive of salaries..... \$12,500 00

Maximum grade before..... 7.05 per cent.

Maximum grade after..... 3.95 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

J. J. ALBERTSON,
Engineer.

WILLIAM C. WOOD,
Supervisor.

MAGNOLIA, N. J., November 1st, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the remainder of Stoy's Landing road, Township of Haddon, county of Camden, State of New Jersey.

Total length, 3,552.1 feet, or .67 miles.

Width of stone-bed, 12 feet.

Length of stone-bed, 3,552.1 feet.

Depth of stone-bed, 8 inches.

Macadam, 4,695.90 square yards, at 89 cents; total.....	\$4,179 35
Earth excavation, 65.5 cubic yards, at 20 cents; total.....	13 10
Supervisor's salary	195 00
Engineering expenses	116 66
	<hr/>
Total.....	\$4,504 11

Maximum grade before..... 4.75 per cent.

Maximum grade after..... 1.50 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

J. J. ALBERTSON,
County Engineer.

WILLIAM C. WOOD,
Supervisor.

COMMISSIONER OF PUBLIC ROADS. 111

We, the subscribers, commissioners appointed by the Governor of the State of New Jersey to estimate and determine the fair and just valuation of the Camden and Blackwood turnpike road, in order for its acquisition by the State and county for a free public road, do certify and report that we find said road to be in good condition and to have a deep covering of gravel, and we do estimate and determine the fair and just value of said road, extending from Ferry avenue, in the city of Camden, to Wentz's Hotel, in the town of Blackwood, township of Gloucester and county of Camden, a distance of 7.39 miles, to be \$10,000.

We further find twenty-four bridges and culverts along said road, in good condition, but no allowance is made for the same, because the township took them with the charter of said road.

We herewith return proof of service and publication.

JACOB PRICE,
 CHARLES C. CLARK,
 ISAIAH M. BRADDOCK,
 THEODORE B. GIBBS,
 JOSEPH C. HOLLINGSHEAD,
Commissioners.

October 30th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Rio Grande and Holly Beach road, township of Middle, county of Cape May, State of New Jersey.

Total length, 12,325 feet, or 2.34 miles.
 Width of gravel-bed, 14 feet.
 Depth of gravel-bed, 8 inches on the upland; 4 inches on the shells on the meadow land.

Contract price, lump sum.....	\$14,500 00
Extra bulkhead	295 47
Award of Surveyors of Highways to Mrs. Mary R. Cresse for right of way	186 30
Supervisor's salary	327 00
Engineering expenses	595 50
Total.....	\$15,904 27

Maximum grade before..... 3.50 per cent.
 Maximum grade after..... 0.00 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

STILLWELL H. TOWNSEND,
Engineer.

ALFRED CRESSE,
Supervisor.

TENTH ANNUAL REPORT.

NEWARK, N. J., November 4th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of Dutch lane, township of Caldwell, county of Essex, State of New Jersey.

- Total length, 13,657 feet, or 2.59 miles.
- Width of stone-bed, 16 feet.
- Length of stone-bed, 13,637 feet.
- Depth of stone-bed, 8 inches.

Telford, 24,268 square yards, at 55 cents; total.....	\$13,347 40
Earth excavation, 10,097 cubic yards, at 35 cents; total.....	3,533 95
	<hr/>
Total.....	\$16,881 35

Maximum grade before.....	7.26 per cent.
Maximum grade after.....	3.68 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

JAMES OWEN,
Engineer.

JAMES H. CADMUS,
Supervisor.

NEWARK, N. J., November 4th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of Grove street, town of Irvington, borough of Vailsburgh and city of East Orange, county of Essex, State of New Jersey.

- Total length, 10,925 feet, or 2.07 miles.
- Width of stone-bed, 16 feet.
- Length of stone-bed, 10,753 feet.
- Depth of stone-bed, 8 inches.

Telford, 19,311 square yards, at 79 cents; total.....	\$15,255 69
Earth excavation, 8,570 cubic yards, at 35 cents; total.....	2,999 50
	<hr/>
Total.....	\$18,255 19

Maximum grade before.....	2 per cent.
Maximum grade after.....	2 per cent.

COMMISSIONER OF PUBLIC ROADS.

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We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

JAMES OWEN,

Engineer.

NATHANIEL D. HALL,

Supervisor.

NEWARK, N. J., November 4th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of Ridgewood avenue, borough of Glen Ridge, county of Essex, State of New Jersey.

Total length, 5,958.60 feet, or 1.03 miles.
 Width of stone-bed, 16 feet.
 Length of stone-bed, 5,940 feet.
 Depth of stone-bed, 8 inches.

Telford, 10,632 square yards, at 55 cents; total.....	\$5,847 60
Earth excavation, 8,912 cubic yards, at 35 cents; total.....	3,119 20
Total.....	<u>\$8,966 80</u>

Maximum grade before..... 9 per cent.
 Maximum grade after..... 2.6 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

JAMES OWEN,

Engineer.

WM. U. OAKES,

Supervisor.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of Main street, Williamstown, Gloucester county, New Jersey.

Total length, 9,350 feet.
 Width of gravel-bed, 32 feet.
 Depth of gravel-bed, 8 inches in center and 6 inches at a point 9 feet on each side of the center line.

TENTH ANNUAL REPORT.

Earth excavation, 9,251 cubic yards, at 22 cents; total.....	\$2,085 22
Compacted gravel, 5,023 cubic yards, at 30 cents; total.....	1,506 90
Overhauls, 2,199 cubic yards, at 15 cents; total.....	329 85
Overhauls, 407 cubic yards, at 30 cents; total.....	122 10
Stripping, 1,683 cubic yards, at 14 cents; total.....	235 62
Gravel	150 00
Supervisor's salary	258 00
Engineering expenses	307 90
Committee expenses	45 00
Advertising and printing.....	22 00
<hr/>	
Total.....	\$5,012 59

Maximum grade before.....	3 per cent.
Maximum grade after.....	2.1 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of the finished pavement was 6 and 8 inches.

Respectfully yours,

WM. C. CATTELL,
Engineer.

WM. C. McILVAINE,
Supervisor.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Clayton and Williamstown gravel road.

- Total length, 31,493 feet.
- Total width, 24 feet.
- Width of gravel-bed, 24 feet wide for 10,100 feet and 14 feet wide for 21,393 feet.
- Depth of gravel-bed, 8 inches in the center and 6 inches at a point 7 feet on each side of the center line.

Earth excavation, 18,627 cubic yards, at 18 cents; total.....	\$3,352 86
Grubbing, 3 acres, at \$75; total.....	225 00
Tile drain, 997 feet, at 5 cents; total.....	49 85
Compacted gravel, 10,551 cubic yards, at 30 cents; total.....	3,165 30
Overhauls, 2,977 cubic yards, at 15 cents; total.....	446 55
Overhauls, 220 cubic yards, at 30 cents; total.....	66 00
Overhauls, 779 cubic yards, at 45 cents; total.....	350 55
Stripping, 4,863 cubic yards, at 15 cents; total.....	729 45
Laying poles	30 00
Gravel	834 66
Cedar poles, 1,100, at 8 cents; total.....	88 00
Supervisor's salary	750 00
Engineering expenses	239 68
Expenses of committee.....	50 25
Advertising and printing.....	22 00
<hr/>	
Total.....	\$10,400 15

COMMISSIONER OF PUBLIC ROADS. 115

Maximum grade before..... 4.2 per cent.
 Maximum grade after..... 2.5 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of the finished pavement was 6 and 8 inches.

Respectfully yours,

WM. C. CATTELL,
Engineer.

JOSEPH M. DUNN,
Supervisor.

December 2d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey.

DEAR SIR—Below find an exact detailed statement of the cost of the River road, townships of Ewing and Hopewell, county of Mercer, State of New Jersey.

Total length, 31,434 feet, or 5.95 miles.
 Width of stone-bed, 14 feet.
 Length of stone-bed, 31,434 feet.
 Depth of stone-bed, Class B, or 6 inches.

Macadam, 49,310 square yards, at 47 2363/4931 cents; total.....	\$23,272 00
Building retaining wall at Keeler's, complete, with coping.....	2,720 95
Building retaining wall at Scudder's Falls, complete, with coping..	10,271 25
Building retaining wall at John Burrough's farm, complete, with coping	1,638 70
Building retaining wall at Burrough's Hollow, complete, with coping,	266 60
Building retaining wall at Burrough's Road, complete, with coping..	2,885 58
Earth excavation, including rock, 24,960 cubic yards, at 60 cents; total	14,976 00
Building retaining wall at Washington's Crossing.....	25 00
Additional excavation, 5,675 cubic yards, at 60 cents; total.....	3,405 00
Laying 960 feet of 12-inch iron pipe.....	960 00
Laying 84 feet of 18-inch and 20-inch iron pipe.....	105 00
Laying 162 feet of 24-inch iron pipe.....	243 00
Supervisor's salary	600 00
Engineering expenses	1,041 32
Total.....	\$62,410 40

Maximum grade before..... 11 per cent.
 Maximum grade after..... 4 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

FRANK J. EPPELE,
Engineer.

ISAAC B. SCUDDER,
Supervisor.

November 3d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Marshall's Corner and Woodsville road, township of Hopewell, county of Mercer, State of New Jersey.

Total length, 12,816 feet, or 2.43 miles.
 Width of stone-bed, 12 feet.
 Length of stone-bed, 12,816 feet.
 Depth of stone-bed, Class B, or 6 inches.

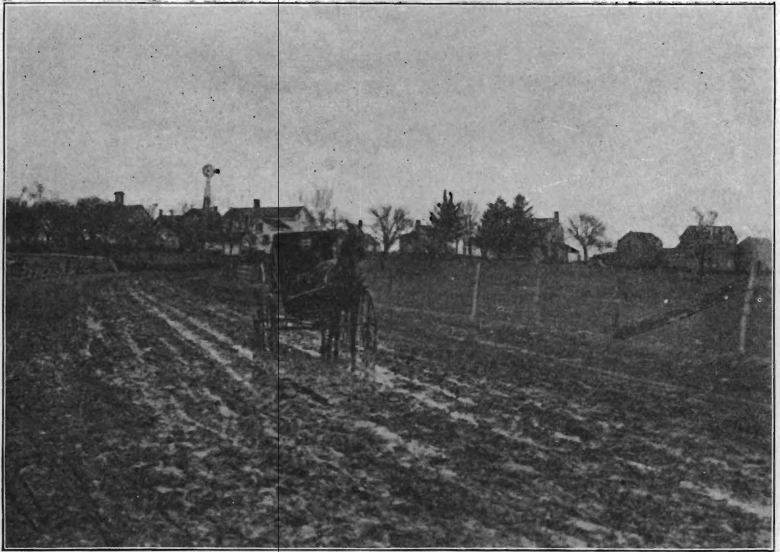
Macadam, 17,456 square yards, at 71 $\frac{34}{4364}$ cents; total.....	\$12,395 00
Laying 180 lineal feet of 10-inch iron pipe cross-drains.....	180 00
Laying 24 lineal feet of 12-inch iron pipe cross-drains.....	24 00
Laying 96 feet of 18-inch iron pipe cross-drains.....	144 00
Laying 60 feet of 24-inch iron pipe cross-drains.....	90 00
Earth excavation, large portion rock, 10,910 cubic yards, at 50 cents; total	5,455 00
Additional rock excavation, 5,057 cubic yards, at \$1.50; total.....	7,585 50
Drain, 7,878 lineal feet, at 40 cents; total.....	3,151 20
Laying 120 lineal feet of 24-inch terra-cotta pipe at Dr. McCauley's, Opening large drain from blacksmith shop to bridge.....	60 00 50 00
Opening large drain from end of pipe to rear of Dr. McCauley's house	25 00
Building approach to Dr. McCauley's barn, including flagging for same	30 00
Supervisor's salary	882 00
Engineering expenses	729 74
Total.....	\$30,801 44
Lump sum, contract price.....	\$17,850 00
Maximum grade before.....	10.6 per cent.
Maximum grade after.....	7 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was Class B, or 6 inches.

Respectfully yours,

FRANK J. EPPELE,
Engineer.

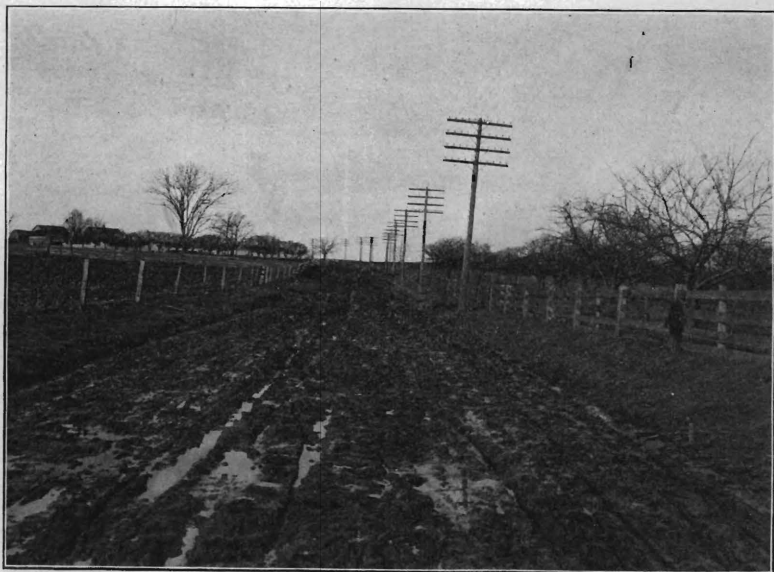
WM. S. RUNKLE,
Supervisor.



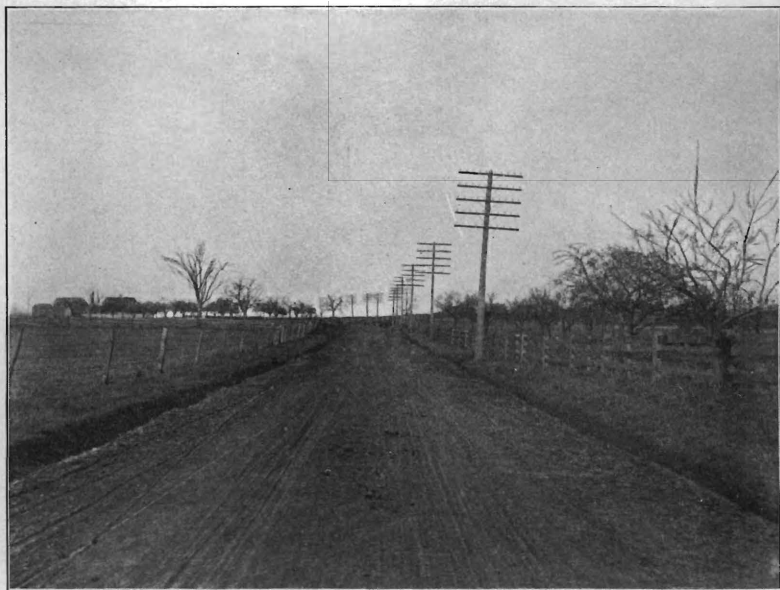
Marshall's Corner and Woodsville road, Mercer Co., before improvement.



Marshall's Corner and Woodsville road, Mercer Co., after completion.



Centreville School House road, Mercer Co., before improvement.



Centreville School House road, Mercer Co., after improvement.

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November 9th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Center-ville road, township of Hopewell, county of Mercer, State of New Jersey.

Total length, 10,400 feet, or 1.97 miles.
 Width of stone-bed, 12 feet.
 Length of stone-bed, 10,400 feet.
 Depth of stone-bed, Class B, or 6 inches.

Macadam, 13,945 square yards, at 54 cents; total.....	\$7,530 30
Masonry in retaining walls at Stony brook, 176 cubic yards, at \$6.25; total.....	1,100 00
Resetting 258 lineal feet of rock-faced coping, at 30 cents; total..	77 40
Lowering stone culvert.....	36 00
Blue-stone coping furnished and set, 4 x 20 inches, 264 lineal feet, at \$1.10; total.....	290 40
Laying 144 feet of 12-inch iron pipe.....	144 00
Earth excavation, including rock, 6,290 cubic yards, at 38 195/629 cents; total.....	2,409 70
Drain, 13,412 lineal feet, at 22 cents; total.....	2,950 64
Supervisor's salary	363 00
Engineering expenses	323 46
Total.....	\$15,224 90
Lump sum, contract price.....	\$9,940 00

Maximum grade before..... 5 per cent.
 Maximum grade after..... 2.75 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was Class B, or 6 inches.

Respectfully yours,

FRANK J. EPPELE,
Engineer.

W. L. BURROUGHS,
Supervisor.

November 3d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Shabakunk road, township of Ewing, county of Mercer, State of New Jersey.

Total length, 10,293 feet, or 1.95 miles.
 Width of stone-bed, 12 feet.
 Length of stone-bed, 10,293 feet.
 Depth of stone-bed, Class B, or 6 inches.

TENTH ANNUAL REPORT.

Macadam, 13,900 square yards, at 67 39/278 cents; total.....	\$9,332 50
Laying 180 lineal feet of 12-inch iron pipe cross-drains.....	180 00
Laying 48 lineal feet of 20-inch iron pipe cross-drains.....	72 00
Earth excavation, 4,225 cubic yards, at 30 cents; total.....	1,267 50
Drain, 14,889 lineal feet, at 22 cents; total.....	3,275 58
Supervisor's salary	228 00
Engineering expenses	353 19

Total..... \$14,708 77

Lump sum, contract price..... \$10,600 00

Maximum grade before..... 5.4 per cent.
 Maximum grade after..... 3.64 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was Class B, or 6 inches.

Respectfully yours,

FRANK J. EPPELE,
Engineer.

WALLACE LANNING,
Supervisor.

November 17th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Oak Tree and Iselin road, townships of Raritan and Woodbridge, county of Middlesex, State of New Jersey.

Total length, 6,600 feet, or 1.25 miles.
 Width of stone-bed, 12 feet.
 Length of stone-bed, 6,600 feet.
 Depth of stone-bed, 8 inches.

Macadam, 8,800 square yards, at 93 cents; total.....	\$8,184 00
Macadam, wings, 37 square yards, at 93 cents; total.....	34 41
Extra fill	150 00
Earth excavation, 5,762 cubic yards, at 42 cents; total.....	2,420 04
Drain, 80 lineal feet, at 27 cents; total.....	21 60
Supervisor's salary	209 00
Engineering expenses	212 08

Total..... \$11,231 13

Maximum grade before..... 6 per cent.
 Maximum grade after..... 2.44 per cent.

COMMISSIONER OF PUBLIC ROADS. 119

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

R. J. DOUGHERTY,
Engineer.

JOHN CORREJA, JR.,
Supervisor.

November 20th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the New Durham road, county of Middlesex, State of New Jersey.

Total length, 5,280 feet, or 1 mile.
Width of stone-bed, 12 feet.
Depth of stone-bed, 8 inches.

Macadam, 7,040 square yards, at 66.4 cents; total.....	\$4,675 60
Earth excavation, 1,316 cubic yards, at 30 cents; total.....	394 80
Drain, 2,000 lineal feet, at 14 cents; total.....	280 00
Supervisor's salary	180 00
Engineering expenses	107 00
Total.....	\$5,637 40

Maximum grade before..... 3.25 per cent.
Maximum grade after..... 2.51 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

R. J. DOUGHERTY,
Engineer.

WILLIAM T. DAYTON,
Supervisor.

November 12th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Plainsboro and Aqueduct road, township of South Brunswick, county of Middlesex, State of New Jersey.

Total length, 7,980 feet, or 1.52 miles.
Width of stone-bed, 12 feet.
Length of stone-bed, 7,980 feet.
Depth of stone-bed, 8 inches.
Number of tons of stone used in construction, 4,216.8.

TENTH ANNUAL REPORT.

Macadam, 10,667 square yards, at 65 cents; total.....	\$6,933 55
Earth excavation, 4,666 cubic yards, at 25 cents; total.....	1,166 50
Drain, 4,000 lineal feet, at 22 cents; total.....	880 00
Supervisor's salary	250 00
Engineering expenses	166 40
	<hr/>
Total.....	\$9,396 45
	<hr/>
Lump sum, contract price.....	\$8,320 05

Maximum grade before..... 6 per cent.
 Maximum grade after..... 2.34 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

R. J. DOUGHERTY,
Engineer.

GEORGE E. WILLIAMSON,
Supervisor.

November 20th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Red Tavern or Applegarth gravel road, county of Middlesex, State of New Jersey.

Total length, 5,280 feet, or 1 mile.
 Width of gravel-bed, 12 feet.
 Depth of gravel-bed, 8 inches.

Gravel, 1,565 cubic yards, at 63 cents; total.....	\$985 95
Earth excavation, 7,189 cubic yards, at 21 cents; total.....	1,509 69
Supervisor's salary	150 00
Engineering expenses	50 00
	<hr/>
Total.....	\$2,695 64

Maximum grade before..... 8.20 per cent.
 Maximum grade after..... 3.41 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

R. J. DOUGHERTY,
Engineer.

ELMER VANDENBURGH,
Supervisor.



New Brunswick and Bound Brook road, Middlesex Co. Landing Hill, during improvement.



New Brunswick and Bound Brook road, Middlesex Co., after improvement.

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October 30th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the New Brunswick and Bound Brook road, county of Middlesex, State of New Jersey.

Total length, 13,200 feet, or 2.50 miles.
 Width of stone-bed, 12 feet.
 Depth of stone-bed, 8 inches.

Macadam, 17,600 square yards, at 49.3 cents; total.....	\$8,672 00
Earth excavation, 1,000 cubic yards, at 20 cents; total.....	200 00
Rock excavation, 2,000 cubic yards, at \$2; total.....	4,000 00
Drain, 1,000 lineal feet, at 10 cents; total.....	100 00
Supervisor's salary	700 00
Engineering expenses	259 44
Total.....	\$13,931 44

Maximum grade before..... 8.60 per cent.
 Maximum grade after..... 5.50 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

R. J. DOUGHERTY,
Engineer.

THOMAS H. HOWLEY,
Supervisor.

November 19th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Sayreville and South Amboy road, township of Sayreville, county of Middlesex, State of New Jersey.

Total length, 11,880 feet, or 2.25 miles.
 Width of stone-bed, 12 feet.
 Length of stone-bed, 11,880 feet.
 Depth of stone-bed, 8 inches.

Macadam, 15,840 square yards, at 54 cents; total.....	\$8,553 60
Iron drain pipe, furnishing and laying.....	500 00
Supervisor's salary	350 00
Engineering expenses	184 07
Total.....	\$9,587 67

Lump sum, contract price..... \$8,703 00

TENTH ANNUAL REPORT.

Maximum grade before..... 4.5 per cent.
 Maximum grade after..... 4.5 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

R. J. DOUGHERTY,
Engineer.

CHAS. STEUERWALD,
Supervisor.

ASBURY PARK, N. J., October 31st, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of Corlies avenue, township of Neptune, county of Monmouth, State of New Jersey.

Total length, 11,100 feet, or 2.10 miles.
 Width of stone-bed (except at beginning of road), 16 feet.
 Length of stone-bed, 11,100 feet.
 Depth of stone-bed, 6 inches.

Macadam, 19,697 square yards, at 70 cents; total.....	\$13,775 00
Earth excavation, 22,300 cubic yards, at 14 cents; total.....	3,122 00
Drain, 6,400 lineal feet, at 8 cents; total.....	512 00
Supervisor's salary	114 00
Engineering expenses	522 00
<hr/>	
Total.....	\$18,045 00

Maximum grade before..... 7.4 per cent.
 Maximum grade after..... 3.5 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

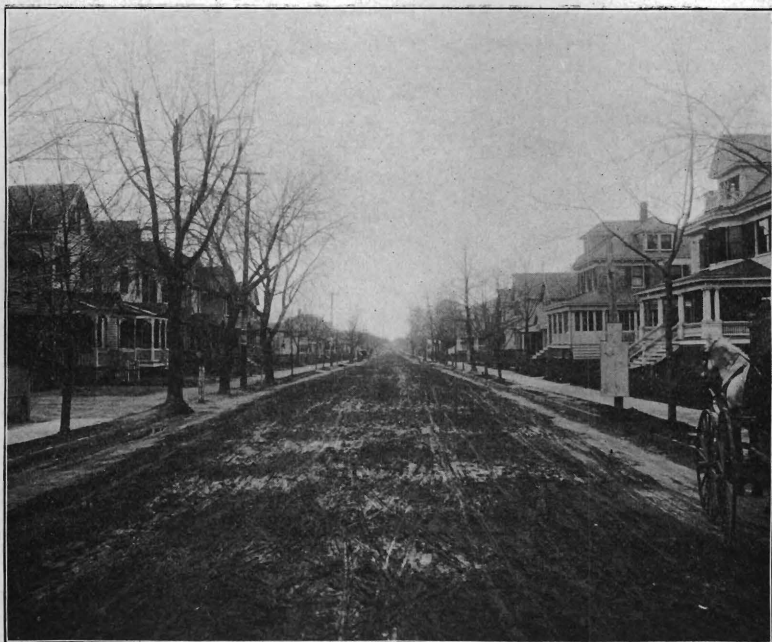
W. H. DE NYSE,
Engineer.

JOHN G. WHITE,
Supervisor.

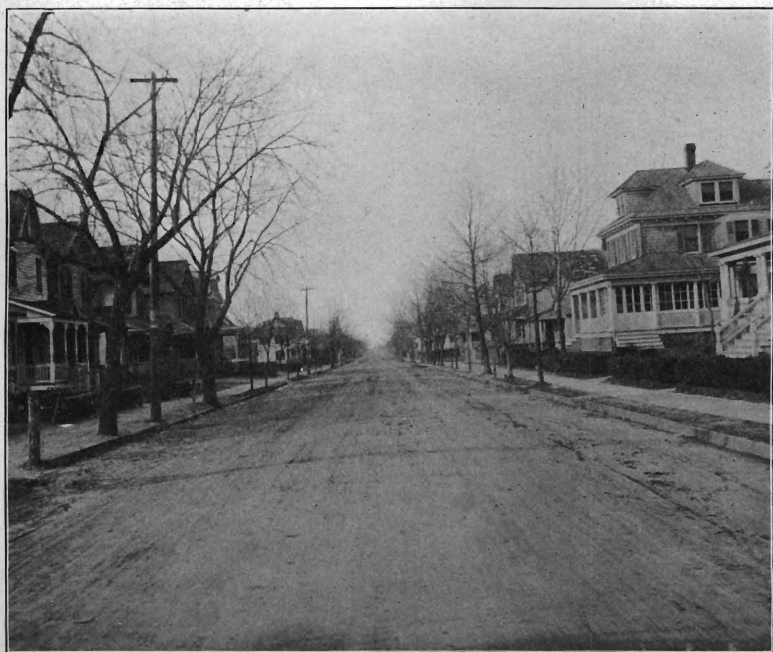
KEYPORT, N. J., October 21st, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Second, John and Church streets stone macadam road, township of Raritan, county of Monmouth, State of New Jersey.



Corliss Avenue, Monmouth Co., before improvement.



Corliss Avenue, Monmouth Co., after improvement.



Manalapan and Freehold road, Monmouth Co., before improvement.



Manalapan and Freehold road, Monmouth Co., after improvement.

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Total length, 4,100 feet, or .78 miles.
 Width of stone-bed, 16 feet.
 Length of stone-bed, 4,100 feet.
 Depth of stone-bed, 8 inches.
 Number of tons of stone used in construction, 2,000.

Macadam, 7,475 square yards, at 70 cents; total.....	\$5,232 56
Drain, 870 lineal feet, at 12 cents; total.....	104 40
Supervisor's salary, 78 days, at \$3 per day; total.....	234 00
Engineering expenses, 3 per cent. of \$5,336.90; total.....	160 10
Total.....	<hr/> \$5,731 00

Lump sum, contract price..... \$5,102 30

Maximum grade before..... 7 per cent.
 Maximum grade after..... 6 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

H. S. SPROUL,
Engineer.

H. O. BAUER,
Supervisor.

November 10th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the first section of the Manalapan and Freehold road, township of Manalapan, county of Monmouth, State of New Jersey.

Total length, 15,390 feet, or 2.92 miles.
 Width of stone-bed, 14 feet.
 Length of stone-bed, 15,390 feet.
 Depth of stone-bed, 8 inches.

Macadam, 23,940 square yards, at 75 cents; total.....	\$17,955 00
Earth excavation, 15,000 cubic yards, at 20 cents; total.....	3,000 00
Stone drain, 7,500 lineal feet, at 30 cents; total.....	2,250 00
Supervisor's salary	400 00
Engineering expenses	464 00
Total.....	<hr/> \$24,069 00

TENTH ANNUAL REPORT.

Maximum grade before.....	2.16 per cent.
Maximum grade after.....	1.56 per cent.

We hereby certify the above statement to be correct.

Respectfully yours,

PETER FORMAN,
Engineer.

ISAAC B. DAVISON,
Supervisor.

November 11th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find detailed statement of the cost of the Manasquan River and Belmar road, township of Wall, county of Monmouth, State of New Jersey.

- Total length, 33,200 feet, or 6.29 miles.
- Width of gravel-bed, 16 feet.
- Length of gravel-bed, 33,200 feet.
- Depth of gravel-bed, 4 and 7 inches.

Terra-cotta and iron pipe for road crossings.....	\$300 00
Gravel, 12,477 cubic yards, at 80 cents; total.....	9,981 60
Earth excavation, to subgrade, 12,644 cubic yards, at 17 cents; total,	2,149 48
Drain, 4,246 lineal feet, at 15 cents; total.....	651 90
Grubbing, ½ acre.....	25 00
Supervisor's salary	300 00
Engineering expenses, 5 per cent. on \$13,107.98; total.....	655 40
Total.....	\$14,063 38

Lump sum, contract price..... \$11,156 06

Maximum grade before.....	3.5 per cent.
Maximum grade after.....	2 per cent.

Respectfully yours,

WILLIAM H. SHAFTO,
Engineer.

A. HOWELL MILLER,
Supervisor.

LONG BRANCH, N. J., August 1st, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of Ocean avenue, North Long Branch, township of Ocean, county of Monmouth, State of New Jersey.



Navesink road, near Stone Church, Monmouth Co., before work was commenced.



Navesink road, near Stone Church, Monmouth Co., after completion.

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Total length, 9,280 feet, or 1.76 miles.
 Width of stone-bed, 16 feet.
 Length of stone-bed, 9,280 feet.
 Depth of stone-bed, 15 inches and upward.
 Number of tons of stone used in construction, 12,210.

Telford, 16,498 square yards, at \$1.21; total.....	\$19,962 58
Gravel, 5,602 cubic yards, at \$1.50; total.....	8,403 00
Earth excavation, 3,892 cubic yards, at 25 cents; total.....	973 00
Supervisor's salary	568 00
Engineering expenses	880 00
Total.....	\$30,786 58

Total allowed by the State..... \$19,962 58

Maximum grade before..... 2.3 per cent.
 Maximum grade after..... 2 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was fifteen inches.

Respectfully yours,

W. H. DE NYSE,
Engineer.

PATRICK MCCARTHY,
Supervisor.

November 9th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the extension of the Navesink road, township of Middletown, county of Monmouth, State of New Jersey.

Total length, 12,276 feet, or 2.32 miles.
 Width of gravel-bed, 16 feet.
 Length of gravel-bed, 12,276 feet.
 Depth of gravel-bed, 7 inches.

Gravel	\$2,600 00
Earth excavation, 12,185 cubic yards.....	6,700 00
Stone gutters, 7,700 lineal feet.....	
Supervisor's salary, 128 days, at \$3; total.....	384 00
Engineering expenses	500 00
Total	\$10,184 00

Maximum grade before..... 11 per cent.
 Maximum grade after..... 9 per cent.

TENTH ANNUAL REPORT.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 7 inches.

Respectfully yours,

FRANK OSBORN,
Engineer.

EDWARD OAKES,
Supervisor.

June 29th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of Main street, Matawan, township of Matawan, county of Monmouth, State of New Jersey.

Total length, 7,900 feet, or 1.50 miles.
Width of stone-bed, 22 feet.
Length of stone-bed, 7,900 feet.
Depth of stone-bed, 8 inches.
Number of tons of stone used in construction, 5,500.

Macadam, 18,248.66 square yards, at 66 cents; total.....	\$12,044 11
Telford, 484.20 square yards, at \$1; total.....	484 20
Earth excavation, 6,173 cubic yards.....	
Drain, 1,105 lineal feet, at 12 cents; total.....	132 60
Supervisor's salary	399 00
Engineering expenses	379 83
Total.....	\$13,439 74

Maximum grade before..... 3.10 per cent.
Maximum grade after..... 2.90 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

H. S. SPROUL,
Engineer.

LEVI S. EMMONS,
Supervisor.

MORRISTOWN, N. J., October 31st, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Newark and Pompton Turnpike road, township of Pequannock, county of Morris, State of New Jersey.

COMMISSIONER OF PUBLIC ROADS.

Total length, 3,993.7 feet, or 0.75 miles.
 Width of stone-bed, 12 feet.
 Length of stone-bed, 3,993.7 feet.
 Depth of stone-bed, 6 inches.
 Number of tons of stone used in construction, 1,597½.

Macadam, 5,325 square yards, at 43 cents; total.....	\$2,289 75
Earth excavation, 2,226 cubic yards, at 25 cents; total.....	556 50
Iron drain pipe, 244 lineal feet, at \$1.75; total.....	427 00
Supervisor's salary	204 00
Engineering expenses	159 59
Total.....	\$3,636 84

Maximum grade before..... 0.30 per cent.
 Maximum grade after..... 0.24 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

WM. E. KING,
County Engineer.

FRANCIS T. BUDD,
Supervisor.

MORRISTOWN, N. J., October 31st, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Green Village road, townships of Morris and Passaic, county of Morris, State of New Jersey.

Total length, 17,931 feet, or 3.40 miles.
 Width of stone-bed, 12 and 16 feet.
 Length of stone-bed, 17,931.
 Depth of stone-bed, 6 inches.
 Number of tons of stone used in construction, 6,686.

Macadam, 24,279 square yards, at 54 cents; total.....	\$13,110 66
Iron pipe, 16-inch, 128 lineal feet, at \$1.60; total.....	204 80
Iron pipe, 12-inch, 77 lineal feet, at \$1.25; total.....	96 25
Iron pipe, 20-inch, 106 lineal feet, at \$2.40; total.....	254 00
Overhaul, 75 cubic yards, at 1 cent per 100 feet; total.....	3 00
Earth excavation, 14,491.70 cubic yards, at 24½ cents; total.....	3,550 46
Rock excavation, 1,863 cubic yards, at \$1.50; total.....	2,794 50
Drain, stone, 15,989 lineal feet, at 12 cents; total.....	1,918 68
Paved gutter, 714 square yards, at 4½ cents; total.....	32 13
Supervisor's salary	510 00
Engineering expenses	582 00
Total.....	\$23,056 88

TENTH ANNUAL REPORT.

Maximum grade before..... 9.1 per cent.
 Maximum grade after..... 5 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

WM. E. KING,
County Engineer.

LEWIS BOING,
Supervisor.

MORRISTOWN, N. J., October 31st, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Sussex and Newton Turnpike road, township of Roxbury, county of Morris, State of New Jersey.

Total length, 5,640 feet, or 1.07 miles.
 Width of stone-bed, 12 feet.
 Length of stone-bed, 5,640 feet.
 Depth of stone-bed, 6 inches.
 Number of tons of stone used in construction, 2,538.

Macadam, 7,520 square yards, at 61 cents; total.....	\$4,587 20
Tile pipe, 16-inch, 103 lineal feet, at \$1.25; total.....	128 75
Tile pipe, 24-inch, 40 lineal feet, at \$3; total.....	120 00
Tile pipe, 12-inch, 18 lineal feet, at \$1.10; total.....	19 80
Tile pipe, 20-inch, 6 lineal feet, at \$2.25; total.....	13 50
Earth excavation, 11,794 cubic yards, at 20 cents; total.....	2,358 80
Rock excavation, 2,215 cubic yards, at \$1.50; total.....	3,322 50
Drain, stone, 254 lineal feet, at 15 cents; total.....	38 10
Drain, iron pipe, 16-inch, 349½ lineal feet, at \$2.25; total.....	786 38
Supervisor's salary	495 00
Engineering expenses	339 52
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Total.....	\$12,209 55

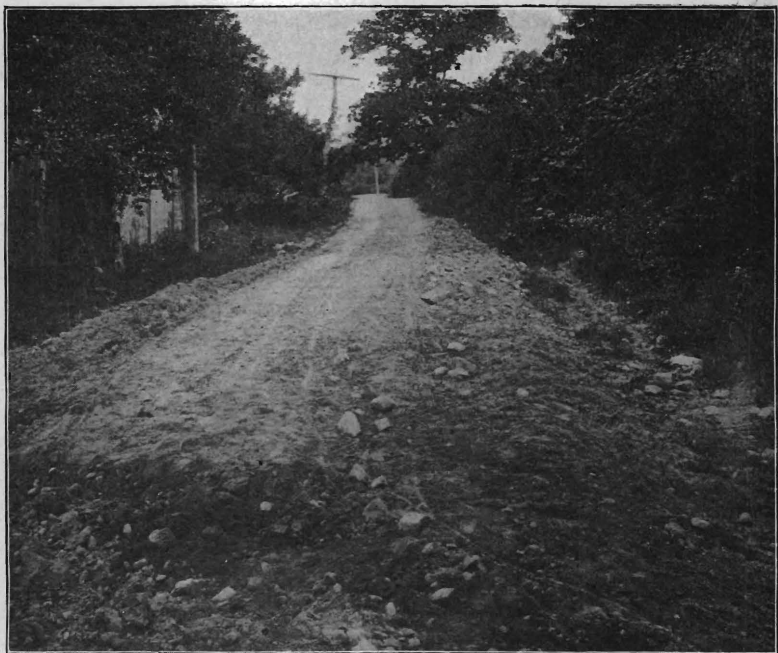
Maximum grade before..... 14 per cent.
 Maximum grade after..... 6 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

WM. E. KING,
County Engineer.

GEO. W. KING,
Supervisor.



Sussex and Newton turnpike, Morris Co., before improvement.



Sussex and Newton turnpike, Sparta, Morris Co., after improvement.

COMMISSIONER OF PUBLIC ROADS. 129

MORRISTOWN, N. J., October 31st, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of part of the Lincoln Park, Montville and Boonton road, township of Montville, county of Morris, State of New Jersey.

Total length, 7,082 feet, or 1.34 miles.
 Width of stone-bed, 12 feet.
 Length of stone-bed, 7,082 feet.
 Depth of stone-bed, 6 inches.
 Number of tons of stone used in construction, 2,641.56.

Macadam, 9,442.66 square yards, at 38 cents; total.....	\$3,588 21
Earth excavation, 9,669 cubic yards, at 24 cents; total.....	2,320 56
Rock excavation, 468 cubic yards, at \$2; total.....	936 00
Drain pipe, iron, 16-inch, 178 lineal feet, at \$2.50; total.....	445 00
Drain pipe, iron, 12-inch, 20 lineal feet, at \$1.75; total.....	35 00
Drain pipe, vitrified, 12-inch, 148 lineal feet, at 75 cents; total....	111 00
Drain pipe, vitrified, 15-inch, 532 lineal feet, at \$1; total.....	532 00
Supervisor's salary	255 00
Engineering expenses	450 00
Total	\$8,672 77

Maximum grade, before..... 9 per cent.
 Maximum grade, after..... 6 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

WM. E. KING,
County Engineer.
 THOMAS BYARD,
Supervisor.

MORRISTOWN, N. J., November 18th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the grading to date on the Newton turnpike from Station 0 to Station 30, township of Randolph, county of Morris, State of New Jersey.

Total length, 3,000 feet, or 0.57 miles.

Earth excavation, 29,616 cubic yards, at 22 cents; total.....	\$6,515 52
Rock excavation, 2,597 cubic yards, at \$1; total.....	2,597 00
Overhaul, 31,035 cubic yards.....	4,531 91
Supervisor's salary	400 50
Engineering expenses	126 00
Total	\$14,170 93

TENTH ANNUAL REPORT.

Maximum grade, before..... 12.50 per cent.
 Maximum grade, after..... 7.80 per cent.

We hereby certify the above statement to be correct.

Respectfully yours,

WM. E. KING,
County Engineer.
 HORACE BAIRD,
Supervisor.

November 11th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Western or First Section, Little Egg Harbor road, county of Ocean, State of New Jersey.

Total length, 10,783 feet, or 2.04 mles.
 Width of gravel-bed, 16 feet
 Length of gravel-bed, 10,783 feet
 Depth of gravel-bed, 6 to 9 inches

Gravel, 3,993.7 cubic yards, at 57 cents; total.....	\$2,276 41
Earth excavation, 13,909 cubic yards, at 25 cents; total.....	3,477 25
Grubbing, 7.43 acres, at \$10; total.....	74 30
Drain, 60 lineal feet, at 20 cents; total.....	12 00
<hr/>	
Total	\$5,839 96

Maximum grade, before..... 5.50 per cent.
 Maximum grade, after..... 1.90 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 to 9 inches.

Respectfully yours,

THEO. P. PRICE,
Engineer.
 J. L. LANE,
Supervisor.

November 11th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Middle or Second Section, Little Egg Harbor road, county of Ocean, State of New Jersey.

Total length, 6,617 feet, or 1.25 miles.
 Width of gravel-bed, 30 feet, in Tuckerton.
 Width of gravel-bed, 16 feet, in West Tuckerton.
 Length of gravel-bed, 6,617 feet.
 Depth of gravel-bed, 4 to 6 inches for 30 feet; 6 to 9 inches for 16 feet.

COMMISSIONER OF PUBLIC ROADS. 131

Gravel, 2,218 cubic yards, at 90 cents; total.....	\$1,196 20
Earth excavation, 1,311.1 cubic yards, at 25 cents; total.....	327 77
Total	<hr/> \$2,323 97

Maximum grade, before.....	5 per cent.
Maximum grade, after.....	2 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly in accordance to the specifications.

Respectfully yours,

THEO. P. PRICE,
Engineer.

J. L. LANE,
Supervisor.

November 11th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Eastern or Third Section, Little Egg Harbor road, county of Ocean, State of New Jersey.

- Total length, 11,142 feet, or 2.11 miles.
- Width of gravel-bed, 16 feet.
- Length of gravel-bed, 11,142 feet.
- Depth of gravel-bed, 6 to 9 inches.

Gravel, 4,126.66 cubic yards, at \$1.10; total.....	\$4,539 33
Earth excavation, 8,052.2 cubic yards, at 20 cents; total.....	1,610 44
Grubbing, 7.67 acres, at \$5; total.....	38 35
Total	<hr/> \$6,188 12

Maximum grade, before.....	6 per cent.
Maximum grade, after.....	2.1 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications.

Respectfully yours,

THEO. P. PRICE,
Engineer.

J. L. LANE,
Supervisor.

TENTH ANNUAL REPORT.

POINT PLEASANT, N. J., November 10th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find statement of the cost of building Sea avenue, Ocean county.

Length of gravel-bed, 4,614 feet, or 0.87 miles.

Width of gravel-bed, 16 feet.

Depth of gravel-bed, 6 and 9 inches.

Lump sum, contract price.....	\$2,687 87
Drain tile, 6-inch, 1,480 feet, at 15 cents; total.....	222 00
Eight connections, at \$1.50 each; total.....	12 00
Top dressing, soil.....	4 00
Extra gravel at Bay avenue crossing and laying 72 feet iron culvert pipe	26 56
Iron culvert pipe, 72 feet.....	40 50
Stone inlets to drains.....	4 00
Supervisor's salary	135 00
Engineering expenses	127 20
Total	<u>\$3,259 00</u>

Maximum grade, before..... 1.18 per cent.

Maximum grade, after..... .62 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 and 9 inches.

Respectfully yours,

WILLIAM H. GULICK,
Supervisor.

WILLIAM SEGOINE,
Engineer.

November 5th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

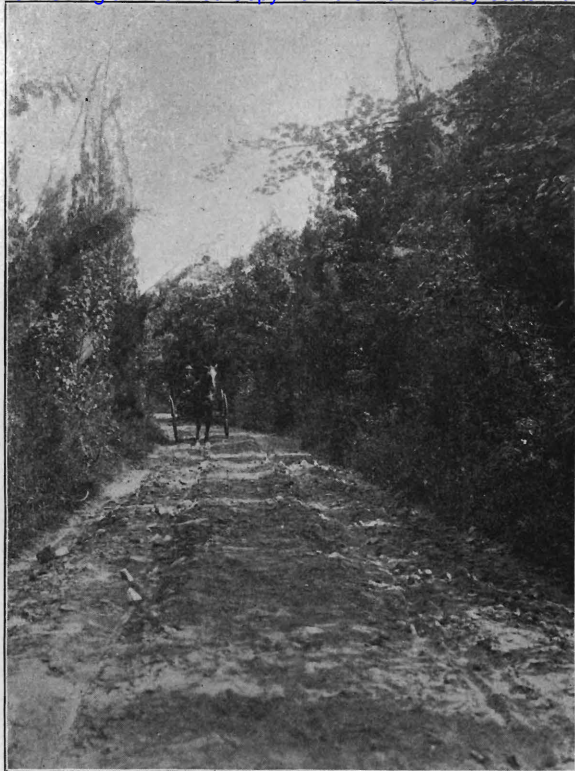
DEAR SIR—Below find an exact detailed statement of the cost of the Clove road, county of Passaic, State of New Jersey.

Total length, 4,640 feet, or 0.88 miles.

Width of stone-bed, 16 feet.

Length of stone-bed, 4,640 feet.

Depth of stone-bed, 4 inches.



Clove Road, Passaic Co., before improvement.



Clove road, Passaic Co., after improvement.

COMMISSIONER OF PUBLIC ROADS.

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Macadam, 8,245 square yards, at 27 cents; total.....	\$2,226 15
Rubble masonry, 34 cubic yards, at \$2.75; total.....	93 50
Trees, 65, at \$4; total.....	260 00
Earth excavation, 11,805.5 cubic yards, at 25 cents; total.....	2,951 38
Rock excavation, 412 cubic yards, at \$1.35 cents; total.....	553 20
Rock excavation, loose, 512 cubic yards, at 40 cents; total.....	204 80
Vitrified pipe, 12-inch, 88 lineal feet, at 70 cents; total.....	61 60
Vitrified pipe, 18-inch, 90 lineal feet, at \$1; total.....	90 00
Steel pipe, 18-inch, 156 lineal feet at \$2.25; total.....	351 00
Cobble gutters, 788 square yards, at 60 cents; total.....	472 80
Catch basins, 2, at \$20; total.....	40 00
Total	\$7,304 43

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 4 inches.

Respectfully yours,
 WILLIAM L. WHITMORE,
Engineer.
 JOHN H. SIGLER,
Supervisor.

November 5th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of East Thirty-first street, city of Paterson, county of Passaic, State of New Jersey.

- Total length, 5,267 feet, or 1 mile.
- Width of stone-bed, 28 feet.
- Length of stone-bed, 5,267 feet.
- Depth of stone-bed, 4 inches.

Macadam, 15,440 2/3 square yards, at 33 cents; total.....	\$5,095 20
Earth excavation, 1,280 cubic yards, at 30 cents; total.....	384 00
Paved gutters, 264.3 square yards, at 60 cents; total.....	158 58
Pipe and catch basin.....	89 59
Total	\$5,727 37

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 4 inches.

Respectfully yours,
 WILLIAM L. WHITMORE,
Engineer.
 GEORGE BOYD,
Supervisor.

November 5th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Squaw Brook road, county of Passaic, State of New Jersey.

Total length, 7,708 feet, or 1.46 miles.
 Width of stone-bed, 14 feet.
 Length of stone-bed, 7,708.
 Depth of stone-bed, 4 inches.

Macadam, 11,887 square yards, at 18 cents; total.....	\$2,139 66
Cobble gutter, 133 1/3 square yards, at 40 cents; total.....	53 34
Earth excavation, 7,156 cubic yards, at 17 cents; total.....	1,216 52
Rock excavation, 743 cubic yards, at 95 cents; total.....	705 85
Steel pipe, 40 lineal feet, at \$1.75; total.....	70 00
Total	\$4,185 37

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 4 inches.

Respectfully yours,

WILLIAM L. WHITMORE,
Engineer.

WILLIAM J. ELLIS,
Supervisor.

November 5th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Macopin road, county of Passaic, State of New Jersey.

Total length, 14,542 feet, or 2.75 miles.
 Width of stone-bed, 14 feet.
 Length of stone-bed, 14,542 feet.
 Depth of stone-bed, 4 inches.

Macadam, 22,712 square yards, at 18 cents; total.....	\$4,088 16
Telford, 730.33 square yards, at 25 cents; total.....	182 58
Dry wall, 441 cubic yards, at \$2; total.....	882 00
Rip rap, 172 square yards, at 60 cents; total.....	103 20
Earth excavation, 18,753.6 cubic yards, at 18 cents; total.....	3,375 65
Rock excavation, 1,138.5 cubic yards, at 95 cents; total.....	1,081 58
Drain, 8-inch, 32 lineal feet, at 40 cents; total.....	12 80
Drain, 12-inch, 407 lineal feet, at 70 cents; total.....	284 90
Drain, 15-inch, 173 lineal feet, at 90 cents; total.....	155 70
Drain, 18-inch, 46 lineal feet, at \$1.10; total.....	50 60
Paved gutter, 621.66 square yards, at 50 cents; total.....	310 83
Trees, 10, at \$4; total.....	40 00
Total	\$10,568 00



Squaw Brook road, Passaic Co., before improvement.



Squaw Brook road, Passaic Co., after improvement.



Elmer and Alloway road, Salem Co., before improvement.



Elmer and Alloway road, Salem Co., after improvement.

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We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 4 inches.

Respectfully yours,
 WILLIAM L. WHITMORE,
Engineer.

ANDREW M. SEHULSTER,
Supervisor.

SALEM, N. J., October 29th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Elmer and Alloway road, township of Upper Pittsgrove, county of Salem, State of New Jersey.

Total length, 20,440 feet, or 3.87 miles.
 Width of gravel-bed, 14 feet.
 Length of gravel-bed, 20,440 feet.
 Depth of gravel-bed, 8 and 6 inches.
 Number of cubic yards of gravel used in construction, 6,182.47.

Cost, lump sum, contract price.....	\$9,409 75
Stripping gravel, 577 1/7 cubic yards, at 35 cents; total.....	202 00
Gravel, 6,182.47 cubic yards, at 5 cents; total.....	309 12
Gravel, extra for shoulders, 200 cubic yards, at 5 cents; total.....	10 00
Earth excavation, extra, 25 cubic yards, at 30 cents; total.....	7 50
Engineering expenses	668 83
	<hr/>
Total.....	\$11,123 20

Lump sum, contract price..... \$9,409 75

Maximum grade, before..... 4.1 per cent.
 Maximum grade, after..... 2.1 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 and 6 inches.

Respectfully yours,
 JOSIAH MILLER,
Engineer.

HENRY COOMBS.
Supervisor.

TENTH ANNUAL REPORT.

SALEM, N. J., October 12th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Salem and Hancock's Bridge road, township of Elsinborough, county of Salem, State of New Jersey.

Total length, 5,709 feet, or 1.081 miles.
 Width of shell-bed, 10 feet.
 Length of shell-bed, 5,709 feet.
 Depth of shell-bed, 12 inches.
 Number of bushels of shells used in construction, 66,582.

Oyster shells, 52,382 bushels, at 3¼ cents; total.....	\$1,702 41
Oyster shells, 8,200 bushels, at 3¾ cents; total.....	307 50
Oyster shells, 6,200 square yards, at 5½ cents; total.....	341 00
Oyster shells, 6,344 square yards, at 16 cents; total.....	1,015 04
Oyster shells, 6,200 bushels placed by County Supervisor.....	96 06
Earth excavation, 2,260 cubic yards, at 23 cents; total.....	519 80
Extra earth excavation by County Supervisor.....	37 60
Grubbing, .654 acres, at \$10; total.....	6 54
Allowance to contractor for extra shells hauled.....	42 00
Supervisor's salary	93 00
Engineering expenses	139 38
Total.....	\$4,300 33

Lump sum, contract price, work only..... \$1,534 84

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 12 inches.

Respectfully yours,

JOSIAH MILLER,
Engineer.

A. SMITH REEVES,
Supervisor.

CHAS. W. DUNN,
County Supervisor.

October 14th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Neshanic road, township of Hillsborough, county of Somerset, State of New Jersey.

Total length, 32,930 feet, or 6.24 miles.
 Width of stone-bed, 12 feet.
 Length of stone-bed, 32,930 feet.
 Depth of stone-bed, 8 and 12 inches.
 Number of tons of stone used in construction, 20,317.



Neshanic road, Somerset Co., before improvement.



Neshanic road, Somerset Co., after improvement.

COMMISSIONER OF PUBLIC ROADS. 137

Macadam, 43,929 square yards, at 64 cents; total.....	\$28,114 56
Telford	3,500 00
Clay, 1,800 cubic yards, at 50 cents; total.....	900 00
Earth excavation, 24,648 cubic yards, at 30 cents; total.....	7,394 00
Cobble gutter and ditching.....	105 04
Drain, 7,000 lineal feet, at 20 cents; total.....	1,400 00
Extra 1½ inch stone	118 64
Supervisor's salary	738 00
Engineering expenses	1,729 76
Total.....	\$44,000 00
Lump sum, contract price.....	\$36,509 17

Maximum grade, before.....	13.5 per cent.
Maximum grade, after.....	8 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 and 12 inches.

Respectfully yours,

JOSHUA DOUGHTY, JR.,
Engineer.

ERNEST C. TAGGART,
Supervisor.

NEWTON, N. J., November 2d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Sparta and Newton road, township of Sparta, county of Sussex, State of New Jersey.

- Total length, 5,300 feet, or 1 mile.
- Width of stone-bed, 12 feet.
- Length of stone-bed, 5,300 feet.
- Depth of stone-bed, 6 inches.
- Number of tons of stone used in construction. No record kept; native stone used.

Preparation of roadbed (cost).....	\$1,776 25
Macadam, 7,067 square yards, at 40 cents; total.....	\$2,826 80
Earth excavation, 5,000 cubic yards, at 25 cents; total.....	1,250 00
Rock excavation, 269¼ cubic yards, at \$1; total.....	269 25
Drain pipes, 120 lineal feet, at \$2; total.....	240 00
Extra carting and laying pipes.....	17 00
Supervisor's salary	367 50
Engineering expenses	110 00
Total.....	\$5,080 55
Lump sum, contract price.....	\$4,406 20

TENTH ANNUAL REPORT.

Maximum grade, before..... 11 per cent.
 Maximum grade, after..... 5.9 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

A. H. KONKLE,
Engineer.

REED J. WASHER,
Supervisor.

NEWTON, N. J., November 6th, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Sussex and Newton road, township of Wantage, county of Sussex, State of New Jersey.

Total length, 7,920 feet, or 1½ miles.

Width of stone-bed, 12 feet.

Length of stone-bed, 7,920 feet.

Depth of stone-bed, 6 inches.

Number of tons of stone used in construction. No record kept; native stone used.

Preparation of roadbed (cost).....	\$2,149 78
Macadam, 4,826 square yards, at 46 cents; total.....	\$2,219 96
Telford, 5,734 square yards, at 46 cents; total.....	2,637 64
Earth excavation, 6,400 cubic yards, at 25 cents; total.....	1,600 00
Tile drains, 1,054 lineal feet, at 17 cents, \$179.18; 50 lineal feet at 50 cents, \$25; total.....	204 18
Drain pipes, cast iron, 12-inch, 216 lineal feet, at \$1.60; total.....	345 60
Supervisor's salary	390 00
Engineering expenses	176 00
Total.....	<u>\$7,573 38</u>

Lump sum, contract price..... \$6,611 20

Maximum grade, before..... 9½ per cent.
 Maximum grade, after..... 4 1/3 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

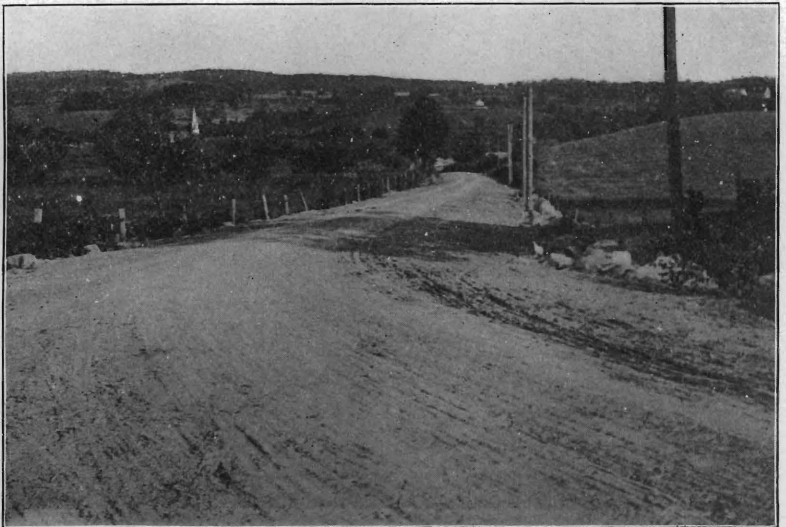
Respectfully yours,

A. H. KONKLE,
Engineer.

B. P. WALLING,
Supervisor.



Stanhope and Newton road, Sussex Co., before improvement.



Stanhope and Newton road, Sussex Co., after improvement.

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NEWTON, N. J., November 2d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Stanhope and Newton road, township of Byram, county of Sussex, State of New Jersey.

Total length, 8,100 feet, or 1.53 miles.

Width of stone-bed, 12 feet.

Length of stone-bed, 8,100 feet.

Depth of stone-bed, 6 inches.

Number of tons of stone used in construction. No record kept; native stone used.

Preparation of roadbed (cost).....	\$3,164 20
Macadam, 10,800 square yards, at 51 cents; total.....	\$5,508 00
Retaining wall	52 96
Extra grading in village of Stanhope.....	158 19
Earth excavation, 8,500 cubic yards, at 24 cents; total.....	2,040 00
Cobble gutter, 250 lineal feet, at 18 cents (in Stanhope); total.....	45 00
Rock excavation, 523 cubic yards, at \$1.10; total.....	575 30
Stone under drain, 400 lineal feet, at 12 cents; total.....	48 00
Drain pipes, 40 lineal feet 24-inch wrought iron pipe, at \$3.25; 35 lineal feet 12-inch wrought iron pipe, at \$1.35; 30 lineal feet 15-inch wrought iron pipe, at \$2.25.....	244 75
Supervisor's salary	421 50
Engineering expenses	146 00
Total.....	\$9,239 70
Lump sum, contract price, for 1½ miles.....	\$7,807 60
Maximum grade, before.....	10 per cent.
Maximum grade, after.....	7 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 6 inches.

Respectfully yours,

A. H. KONKLE,
Engineer.

LEWIS HUYLER,
Supervisor.

HACKETTSTOWN, N. J., October 23d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of Section 1 of the Danville road, township of Independence, county of Warren, State of New Jersey.

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Total length, 6,327 feet, or 1.2 miles.
 Width of stone-bed, 12 feet.
 Length of stone-bed, 6,312 feet.
 Depth of stone-bed, 8 inches loose stone.
 Number of tons of stone used in construction, 2,735.

Macadam, 8,416 square yards, at 48 cents; total.....	\$4,039 68
Retaining wall, 51¼ cubic yards, at \$1.50; total.....	76 87
Earth excavation, 5,800 cubic yards, at 23 cents; total.....	1,334 00
Rock excavation, 133 cubic yards, at \$1; total.....	133 00
Drain, tile pipe, 15-inch, 826 lineal feet, at \$1.30; total.....	1,073 80
Drain, tile pipe, 12-inch, 142 lineal feet, at \$1.10; total.....	156 20
Drain, tile pipe, 5-inch, 95 lineal feet, at 30 cents; total.....	28 50
Drain, stone, 4,850 lineal feet, at 15 cents; total.....	727 50
Supervisor's salary	195 00
Engineering expenses	100 00
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Total.....	\$7,864 55

Maximum grade, before..... 10.4 per cent.
 Maximum grade, after..... 6 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 7 inches.

Respectfully yours,

S. W. SALMON, ,
Engineer.
 JOHN MERRELL,
Supervisor.

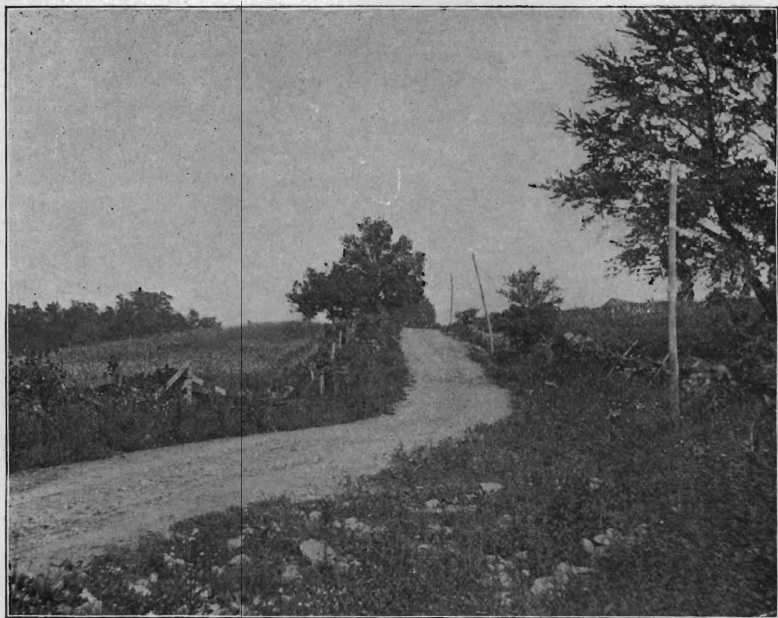
STEWARTSVILLE, N. J., October 23d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

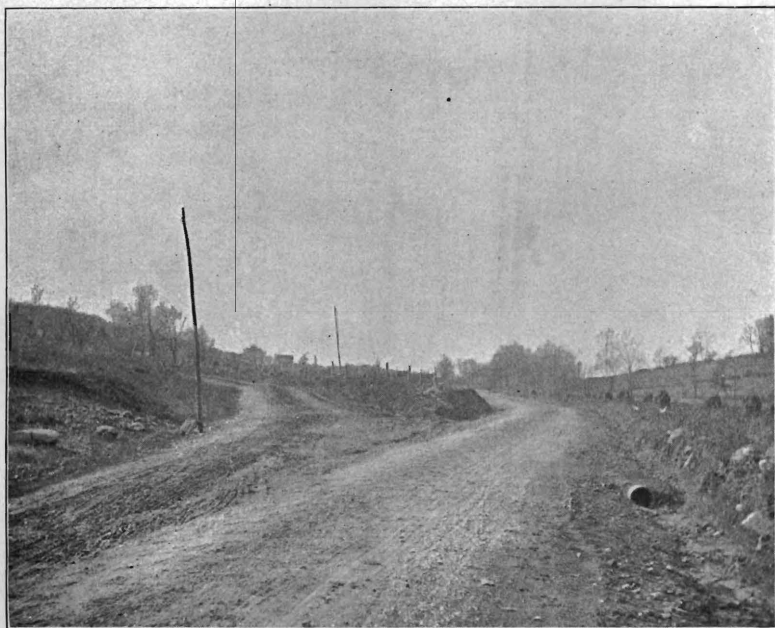
DEAR SIR—Below find an exact detailed statement of the cost of Section 1 of the Stewartsville road, township of Greenwich, county of Warren, State of New Jersey.

Total length, 6,738 feet, or 1.28 miles.
 Width of stone-bed, 2,021 feet, 16 feet; 4,625.4 feet, 12 feet.
 Length of stone-bed, 6,646.4 feet.
 Depth of stone-bed, 8 inches loose stone.
 Number of tons of stone used in construction, 3,228.

Macadam, 9,797.09 square yards, at 57 cents; total.....	\$5,584 34
Earth excavation, 4,100 cubic yards, at 27 cents; total.....	1,107 00
Rock excavation, 1,433 cubic yards, at \$2; total.....	2,866 00
Drain, iron pipe, 16-inch, 120 lineal feet, at \$1.90; total.....	228 00
Drain, tile pipe, 20-inch, 120 lineal feet, at \$2; total.....	240 00
Drain, tile pipe, 15-inch, 280 lineal feet, at \$1.30; total.....	364 00
Drain, tile pipe, 12-inch, 128 lineal feet, at \$1.10; total.....	140 80
Drain, tile pipe, 8-inch, 28 lineal feet, at 65 cents; total.....	18 20
Supervisor's salary	205 50
Engineering expenses	106 00
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Total.....	\$10,859 84



Independence road, Warren Co., just east of Vienna, before improvement.



Independence road, Warren Co., one-half mile west of Hackettstown, after improvement.
Showing changed line to avoid steep grade.

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Maximum grade, before..... 12 per cent.
 Maximum grade, after..... 7½ per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

S. W. SALMON,

Engineer.

SAMUEL S. STEWART,

Supervisor.

STEWARTSVILLE, N. J., October 23d, 1903.

Mr. Henry I. Budd, State Commissioner of Public Roads, Trenton, New Jersey:

DEAR SIR—Below find an exact detailed statement of the cost of the Straw Church road, township of Pohatcong, county of Warren, State of New Jersey.

Total length, 7,735 feet, or 1.46 miles.
 Width of stone-bed, 6,221.5 feet, 12 feet; 1,484 feet, 14 feet.
 Length of stone-bed, 7,705.5 feet.
 Depth of stone-bed, 8 inches loose stone.
 Number of tons of stone used in construction, 3,397.

Macadam, 10,603.77 square yards, at 64 cents; total.....	\$6,786 41
Earth excavation, 4,534 cubic yards, at 27 cents; total.....	1,224 18
Drain, iron pipe, 12-inch, 36 lineal feet, at \$1.40; total.....	50 40
Drain, iron pipe, 16-inch, 96 lineal feet, at \$1.90; total.....	182 40
Drain, iron pipe, 20-inch, 96 lineal feet, at \$3.05; total.....	292 80
Supervisor's salary	115 50
Engineering expenses	130 00
	<hr/>
Total.....	\$8,781 69

Maximum grade, before..... 12 per cent.
 Maximum grade, after..... 7 per cent.

We hereby certify the above statement to be correct, and that the pavement was constructed strictly according to the specifications, and that the depth of finished pavement was 8 inches.

Respectfully yours,

S. W. SALMON,

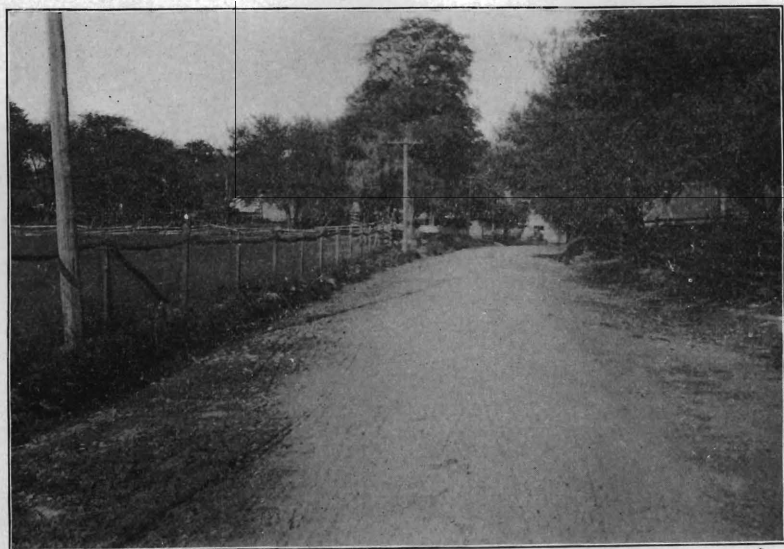
Engineer.

SAMUEL S. STEWART,

Supervisor.



Stanhope and Newton road, Sussex Co., before improvement.



Sparta and Newton road, Sussex Co., after improvement.

APPENDICES.

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APPENDIX A.

Standard State Aid Specifications for Stone Roads as Amended
by the State and County Road Engineers, February
1st, 1901, and Revised May 20th, 1903.

SPECIFICATIONS.

For a STONE ROAD in.....County, New Jersey, known
as.....beginning at.....
and extending to.....a distance of
.....miles
.....feet wide and.....inches deep.

WORK TO BE PERFORMED.

1. The work to be performed will consist in furnishing all material, tools, machinery and labor necessary for the efficient and proper grading of roadway, side ditches and side banks; laying, spreading and rolling of road metal, and leaving the roadway complete in every manner ready for immediate use.

PLANS AND DRAWINGS.

2. The plan, profile and cross-sections on file in the office of the State Commissioner of Public Roads and at the office of..... County Engineer.....New Jersey, show general location, profile, details and dimensions. The work will be constructed in all respects according to the above-mentioned plans, profile and cross-sections, which form part of these specifications.

3. Any variation of location, profile, size and dimensions from that shown on the plans, as may be required by the exigencies of construction, will, in all cases, be determined by the Engineer; but the contractor shall not, on any pretense, save that of the written order of the contracting parties, deviate from the intent of the plans or specifications.

4. On all drawings, figured dimensions are to govern in cases of discrepancy between scale and figures.

GRADING.

5. Under this head will be included all excavation and embankment required for the formation of the highway; cutting all ditches or drains about or contiguous to the road; removing all fences, walls, buildings, trees, poles or other encumbrances; the excavation and embankment necessary for reconstructing cross or branch roads in cases where they are destroyed or interfered with in the formation of the roadway, and all other excavations and embankments connected with or incidental to the construction of the said road.

EXCAVATION.

6. The roadway to the width of.....feet as shown on plan must be excavated or built to the same curvature as that of the surface of the road when finished; the grade, from center to sides, must be as shown on plans.

7. The earth taken from any cut or ditch shall be deposited where the Engineer may direct, either within or without the line of the road, but no earth shall be removed from the line of the road without the order of the Engineer.

8. The grading shall be completed for the full width of the road, from gutter to gutter, before any macadamizing is commenced.

EMBANKMENT.

9. Material taken from the excavations, except when otherwise directed by the Engineer, shall be deposited in the embankments, either on the roadway or sidewalks. Rejected or excess material will be used to increase the width of the embankments or deposited in spoil banks or waste piles, as and where the Engineer may direct.

10. When there is not sufficient material in the excavations of the road to form the embankments, the deficiency must be supplied by the contractor from without the road. The character of said material and place of excavation must be approved by the Engineer. Said material is to be paid for at the same price per cubic yard as specified in the contract for other excavation.

11. The embankments will be formed in layers of such depth, generally one (1) foot, and the material deposited and distributed in such a manner as the Engineer may direct, the required allowance for settling being added.

SLOPES.

12. Slopes in both embankments and excavations shall be one and one-half ($1\frac{1}{2}$) horizontal to one (1) vertical, unless otherwise ordered by the Engineer.

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ROADWAY.

Sub-Foundations.

13. When the excavations and embankments have been brought to a proper depth below the intended surface of the roadway, and the cross-section thereof, conforming in every respect to the cross-section of the road when finished, the same shall be rolled with a.....ton steam roller until approved by the Engineer and Supervisor. If any depressions form under such rolling, owing to improper material or vegetable matter, the same shall be removed and good earth substituted, and the whole re-rolled until thoroughly solid and to above-mentioned grade. Water must be applied in advance of the roller when, in the opinion of the Engineer and Supervisor, it is necessary.

STONE CONSTRUCTION.

Telford Foundations.

14. After the roadbed has been formed and rolled, as above specified, and has passed the inspection of the Engineer and Supervisor, a bottom course of stone, of an average depth of.....inches, is to be set by hand as a close, firm pavement, the stones to be placed on their broadest edges lengthwise across the road in such manner as to break joints as much as possible, the breadth of the upper edge not to exceed four (4) inches. The interstices are then to be filled with stone chips, firmly wedged by hand with a hammer, and projecting points broken off. No stone of greater length than ten (10) inches or width of four (4) inches shall be used, except each alternate stone on outer edge, which shall be double the length of the others and well tied into the bed of the road; all stones with a flat, smooth surface must be broken; the whole surface of this pavement to be subjected to a thorough settling or ramming with heavy sledgehammers, and thoroughly rolled with aton.....roller. No stone larger than two and one-half ($2\frac{1}{2}$) inches to be left loose on top of telford.

MACADAM.

First Course of Broken Stone.

15. After the roadbed has been formed and rolled as above specified, and has passed the inspection of the Engineer and Supervisor, the first layer of broken stone, consisting of two and one-half ($2\frac{1}{2}$) inch stone, or stone that will pass through a ring three (3) inches in diameter, shall be deposited in a uniform layer, having a depth of.....inches, and

rolled repeatedly with a.....ton.....roller until compacted to the satisfaction of the Engineer and Supervisor. No stone in this course shall be less than two (2) inches in length. Water must be applied in advance of the roller when, in the opinion of the Engineer, it is necessary.

16. The depth of loose stone in this and all other courses must be measured by blocks the required thickness of the said loose stone. These blocks to be placed at frequent intervals amid the loose stone when being spread.

BINDER BETWEEN FIRST AND SECOND COURSE FOR TELFORD OR MACADAM.

17. On the first course of stone a quantity of.....binder shall be spread in a uniform layer, and the rolling continued until the stones cease to sink or creep in front of the roller; water will be applied in advance of the roller, if ordered by the Engineer. The quantity and quality of this and all other binding to be at all times subject to the approval of the Engineer and Supervisor.

SECOND COURSE OF BROKEN STONE FOR MACADAM OR TELFORD.

18. The second course of broken stone shall consist of one and one-half ($1\frac{1}{2}$) inch stone; that is, every piece of stone shall be broken so that it can be passed through a ring two (2) inches in diameter, and no stone shall be more than two (2) inches or less than one (1) inch long. This course is to be spread in a uniform layer of.....inches in depth, and rolled until thoroughly settled into place to the satisfaction of the Engineer and Supervisor. Water will be applied if ordered by the Engineer and Supervisor.

BINDER ON SECOND COURSE OF STONE.

19. Binder on this course of stone must be applied in same manner as binder on first course of stone (see Article 17), as directed by Engineer and Supervisor.

SURFACE.

20. When the two courses are rolled to the satisfaction of the Engineer and Supervisor, a coat of fifty (50) per cent. of three-quarters ($\frac{3}{4}$) inch stone and fifty (50) per cent. of screenings, properly mixed, is to be spread of sufficient thickness to make a smooth and uniform surface to the road; then again rolled until the road becomes thoroughly consolidated, hard and smooth.

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21. Rolling to be done by contractor with.....ton.....roller, approved by the Engineer.

22. Any depressions formed during the rolling, or from any other cause, are to be filled with one and one-half ($1\frac{1}{2}$) inch stone or three-quarter ($\frac{3}{4}$) inch stone or both and screenings approved by the Engineer, and the roadway brought to the proper grade and curvature as determined by him.

23. Water must be applied in such quantities and in such manner as directed by the Engineer and Supervisor.

MANNER OF ROLLING.

24. In the rolling the roller must start from the side lines of the stone-bed and work towards the center, unless otherwise directed. The rolling shall at all times be subject to the directions of the Engineer and Supervisor, who may, from time to time, direct such methods of procedure as in their opinion the necessities of the case may require.

QUALITY OF MATERIAL.

25. All stone must be as nearly cubical as possible, broken with the most approved modern stone-crushing machinery, free from all screenings, earth and other objectionable substances, of uniform size and the same kind and quality, or equally as good in every particular as that shown in the Engineer's office. The one and one-half ($1\frac{1}{2}$) inch stone, three-quarter ($\frac{3}{4}$) inch and screenings for binder and final finish must be of the best trap-rock, free from loam or clay.

26. The contractor must furnish samples to the Engineer of the kind of stone to be used in the work before the opening of the bids.

SHOULDERING.

27. A shoulder of firm earth or gravel is to be left or made on each side, extending at the same grade and curvature of road to side ditches or gutters. This shoulder is to be rolled according to the directions of the Engineer.

SIDE DITCHES OR GUTTERS.

28. The side ditches or gutters are to be excavated as per stakes furnished by Engineer, in order to give an easy flow of water, so that no water shall be left standing on the road or in the ditches, for all of which no extra payment will be made.

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UNDER-DRAINS.

29. Under-drains, if found necessary, shall be constructed by the contractor (at prices named in bids) of good.....inca tile, laid upon a board of not less than one (1) inch in thickness and six (6) inches in width, whenever and wherever the Engineer and Supervisor shall decide; top of tile to be at least.....inches deep, unless otherwise directed by the Engineer, the joints of the tile to be covered with salt hay or material equally as good, and trench filled with previous earth.

30. When directed by the Engineer a stone drain may be used in place of the tile drain. A trench one foot wide and one foot six inches in depth shall be excavated below the sub-grade, said excavation to be filled with loose broken stone to a depth required by the Engineer.

NO EXTRA PRICE.

31. No allowance in measure of depth of pavement will be made on account of any material which may be driven into the roadbed by rolling. The pavement when completed must conform to the grade and the cross-sections, and be satisfactory to the Engineer, whose decision shall be final.

32. No extra work will be paid for unless the price has been agreed upon between the contracting parties, including the State Commissioner of Public Roads, and endorsed upon the agreement, witnessed by the Engineer.

33. All clay or gravel for shouldering or binder and all extra hauling is to be done at the contractor's expense.

BROAD TIRE WAGONS.

34. All wagons and carts used during the construction for hauling stone, earth or any other material must have tires not less than three and one-half (3½) inches in width.

BIDS.

35. Bids will only be received under these specifications for the road complete. The prices per yard for excavation, telford, macadam, &c., are intended for the use of the Engineer in making estimate to the Board of Chosen Freeholders of work done. No bids will be received in which all of the following items are not filled out:

- (1) Price per cubic yard for earth excavations, without classification, as per cross-sections throughout the length and width of the road.
- (2)

COMMISSIONER OF PUBLIC ROADS.

- (3) Price per square yard for telford road complete.
- (4) Price per square yard for macadam road complete.
- (5) Price per lineal foot for under-drains, furnishing all labor and material.
- (6) Price (lump) for the whole road complete, according to above specifications and plans.

ESTIMATE OF QUANTITIES.

- 36. (1) Excavation, earth.....cubic yards.
- (2)
- (3) Telford.....square yards, as specified.
- (4) Macadam.....square yards, as specified.
- (5) Under-drains.....lineal feet.
- (6)

37. These quantities are the result of calculation, but are to be considered as approximate. The County will not be responsible for any excess in above quantities, should any occur. The contractor is expected to satisfy himself as to the nature, character and quantity of the labor and material required by a personal examination of the work contemplated.

CHECK ACCOMPANYING BIDS.

38. Bids shall be accompanied with a certified check, payable to the Director of the Board of Chosen Freeholders, for the sum of One Thousand (\$1,000.00) Dollars, as a guarantee that if the contract shall be awarded to him he will, when required by said Board, execute an agreement in writing to perform the work according to the specifications, and upon failure by the contractor to enter into said agreement with the said Board of Chosen Freeholders, said certified check shall be forfeited and considered as liquidated damages.

LIABILITIES OF CONTRACTOR.

39. He shall maintain sufficient guards by day and night to prevent accidents from travel, and will be liable for any damage which may arise from his neglect to do so, or from any omission on his part.

40. He shall keep the road sprinkled until the final certificate of completion by the Engineer is given.

41. He is to commence and prosecute the work upon the road at such points as may be directed by the Engineer within.....days from and after the signing of the contract, and shall continue work thereon until completion, except as herein provided.

42. He further agrees to complete the same on or before the..... day of.....A. D..... Twenty dollars for each day that the work shall remain uncompleted, after the time allowed by contract, may be deducted, as liquidated damages, from any moneys due contractor, unless otherwise agreed upon by the Board of Chosen Freeholders, after presentation of certificate of the Engineer recommending the extension of the time limit of completion. A bonus or premium of one dollar per week will be paid the contractor for each week the road is completed before the time specified in the contract.

43. The contractor shall keep the finished roadway and earthwork in repair for the period of one year from the date of its completion and acceptance, during which time he shall be liable for wear and tear caused by ordinary travel, and in addition thereto, for as much longer as for any period or periods during said year it shall be out of proper condition. If, during that time, the roadway or any part of the work shall, in the judgment of the Engineer and Board of Chosen Freeholders, require repairing, and they shall duly notify the contractor to make such repairs as required, and the contractor shall refuse or neglect to do so to the satisfaction of the said Engineer and Board of Chosen Freeholders, within five days from the date of service of notice, then the said Engineer and Board of Chosen Freeholders shall have the right to have the work done properly by other parties and pay the expense for the same out of the five per cent. retained.

44. The contractor will be required to preserve all stakes and benchmarks made and established on the line of work until duly authorized by the Engineer to remove the same.

45. The contractor shall not disturb the position of title stones (the corners of properties adjacent to the road), but where they appear he will either lift or lower them, under the personal supervision of the Engineer.

46. The contractor must also preserve the roadway on which he is working from needless obstruction, and where necessary he must construct safe and commodious crossings, to be maintained in good order. He shall afford all proper and reasonable means for the accommodation of the public, and leave the roadway complete in every manner ready for immediate use.

PROVISION FOR DRAINAGE.

47. If it is necessary in the prosecution of the work to interrupt or obstruct the natural drainage of the surface, or the flow of artificial drains, the contractor shall provide for the same during the progress of the work in such a way that no damage shall result to either public or private interests. He shall be held liable for all damages which may result from any neglect to provide for either natural or artificial drainage, which he may have interrupted.

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RIGHT TO BUILD BRIDGES, CULVERTS, ETC., AND SUSPENSION OF WORK.

48. The right of the county to build bridges, culverts, lay pipes or other appurtenances in said road during the progress of the work is expressly reserved, as well as suspending the work or any part thereof during the construction of the same, for the purposes above stated, without further compensation to the contractor for such suspension than an extension of time for completing the work as much as it may have been delayed.

STOPPING WORK ON ACCOUNT OF WEATHER.

49. The Engineer or Supervisor may stop any portion of the work if, in their judgment, the weather is such as to prevent the same being done properly. No allowance of any kind will be made for such stoppage, except an extension of the time for the completion of the work as herein provided.

ABANDONMENT OF CONTRACT.

50. If at any time the work under contract should be abandoned, or if at any time the Engineer should judge and so certify in writing that said work, or any part thereof, is unnecessarily delayed, or that the contractor is willfully violating any of the conditions or covenants of this contract, or is executing the same in bad faith, then, and in that case, the Board of Chosen Freeholders shall notify the said contractor to discontinue all work under this contract. They may employ other parties to complete the work in such manner as they may decide, and use such material as may be procured upon the line of aforesaid work, and, if necessary, to procure other material for its completion, and charge the expense of the said labor and material to the contractor, which expense shall be deducted from any moneys due him under contract. In case these expenses shall exceed the sum which would have been payable under contract, if the same had been completed by said contractor, he or his bondsmen shall pay the amount of the excess to the Board of Chosen Freeholders, on notice from the Engineer.

ENGINEER.

51. The Engineer is to be selected or appointed by the Board of Chosen Freeholders and paid by them. He is to furnish all surveys, profiles, plans, specifications and estimates of quantities of all kinds before specifications are signed, and in such a clear manner that lump bids can be made upon the work. He shall furnish all lines and grades required for the completion of the work. He is to furnish estimates for quantities of work done before partial payments can be made, the quantity of road laid being

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determined by surface measurements. Should any difference arise between the contracting parties hereto, the same shall be referred to the County Engineer and his decisions on these matters are to be final and conclusive. The work is to be done according to his directions, and if any material of which he does not approve is brought upon the road, it is to be removed at the expense of the contractor. If the contractor fails or neglects to do any part of the work as specified or as directed by the Engineer, then in that case all other work shall be discontinued on notice from the Engineer to the contractor, or to the superintendent or foreman in charge of the work for the contractor, until such time as the work complained of has been done to the satisfaction of the Engineer; and the contractor will not be entitled to or allowed any compensation or extension of time for such discontinuation or suspension of the work.

SUPERVISOR.

52. Nothing in these specifications relating to the duties of the Engineer shall be taken or construed in any manner to conflict with the duties of the Supervisor, as specifically set forth in the act entitled "An act to provide for the permanent improvement of the public roads of this State," approved April 1st, 1903, and the acts supplementary thereto, but they shall co-operate as far as practicable.

INCOMPETENT WORKMEN.

53. The contractor shall employ competent men to do the work, and whenever the Supervisor shall inform him, or his representative in charge, in writing, that any man on the work is unfitted for the place, or is working contrary to the provisions of the specifications or the instructions of the Engineer and Supervisor, he shall thereupon be discharged.

INSPECTION.

54. All directions and determinations necessary to give due and full effect to any of the provisions of these specifications shall be given by the Engineer and Supervisor.

55. All material and workmanship of any kind shall be subject at all times to the inspection of the Engineer and Supervisor. Whenever unfaithful and imperfect work is discovered, it shall be immediately repaired or replaced by the contractor, after due notification from the Engineer and Supervisor.

SUB-LETTING OF CONTRACT.

56. The contractor shall not assign or sub-let any portion of this contract without the consent of the Board of Chosen Freeholders and the State Commissioner of Public Roads.

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PAYMENTS.

57.monthly payments will be made by the Board of Chosen Freeholders to the contractor for work performed, upon presentation by him of the proper certificates of the Engineer and Supervisor in a sum not to exceed eighty per cent. of the amount then due, together with releases from all liens, if required. Fifteen per cent. will be paid at the completion of the work. The remainder of five per cent. will be retained by the Board of Chosen Freeholders for a period of one year, as provided for in Article 43.

BOND OF CONTRACTOR.

58. The contractor will be required to execute, within thirty days of giving of contract, a bond in such sum and with such securities as shall be approved by the Board of Chosen Freeholders, conditioned for the faithful performance of the contract, to indemnify and save harmless the Said Board of Chosen Freeholders from all suits or actions of any name or description brought against them on account of any act or omission of the contractor or his agents, and for the faithful performance of the contract by the contractor. Said bond shall be in a sum of not less than the estimated cost of the road when completed. Any change made in said plans, specifications, agreements or quantities without the consent of the bondsmen shall in no way vitiate said bond. The said contractor hereby further agrees that so much of the money due him, under and by virtue of this agreement, as shall be considered necessary by the Board of Chosen Freeholders, may be retained by them until all such suits or claims for damages aforesaid shall have been settled, and evidence to that effect furnished to the satisfaction of the said Board of Chosen Freeholders.

CONTRACTOR TO INSURE PAYMENT FOR LABOR, MATERIAL, ETC.,
ON FINAL ESTIMATE.

59. The contractor must also furnish said Engineer and Supervisor with satisfactory evidence that all persons who did work, or furnished material for this contract, or who have sustained damage or injury by reason of any act, omission or carelessness on his part or his agents in the prosecution of the work, have been duly paid or secured; he shall also give notice to said Engineer and Supervisor within ten days after the completion of the work, and before final estimate is made, that any balance for such work or materials, or compensation for such damages due, has been fully paid or released.

COMMISSIONER OF PUBLIC ROADS.

PROPOSALS.

To the Board of Chosen Freeholders of the County of.....State of New Jersey:

Gentlemen—The undersigned hereby declare..that...he...ha.... carefully examined the annexed specifications and the drawings therein referred to, and will provide all necessary machinery, tools apparatus and other means of construction, and do all th work and furnish all the material called for by said specifications in the manner prescribed by the specifications and the requirements of the Engineer and Supervisor under them, for the following prices:

- (1) Price per cubic yard for earth excavations, without classification, as per cross-sections throughout the length and width of the road.
(2)
(3) Price per square yard for telford road complete.
(4) Price per square yard for macadam road complete.
(5) Price per lineal foot for under-drains, furnishing all labor and material.
(6) Price (lump) for the whole road complete, according to above specifications and plans.

Accompanying this proposal is a certified check for the sum of one thousand (\$1,000) dollars, payable to the order of the Director of the Board of Chosen Freeholders of.....county; which check is to be forfeited as liquidated damages if, in case this proposal is accepted, the undersigned shall fail to execute a contract with said Board of Chosen Freeholders, under the conditions of this proposal, within the time provided for by the foregoing advertisement for proposals; otherwise, said check is to be returned to the undersigned.

Signed.....

Address.....

.....N. J.....

TENTH ANNUAL REPORT.

CONTRACT.

This agreement, made the.....day of
.....in the year of our Lord one thousand nine
hundred.....
between THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY
OF.....party of the first part, and

.....party of the second part,

Witnesseth, That the said party of the second part, for and in con-
sideration of the payments hereinafter specified and agreed to be made
by the party of the first part, hereby covenant and agree to furnish and
deliver all the materials and to do and perform all the work and labor
required to be furnished and delivered, done and performed in and about
the macadamizing of.....
beginning at.....
and extending to.....

.....in the township of.....a distance of.....

.....in strict and entire conformity with the plans on file in the Engineer's
office and with the specifications hereto annexed and duly approved by
resolution of THE BOARD OF CHOSEN FREEHOLDERS OF THE
COUNTY OF.....adopted the.....

day of.....in the year of our Lord one thousand nine
hundred.....and approved by the State Commissioner

of Public Roads on the.....day of.....
in the year of our Lord one thousand nine hundred and.....

which said plans and specifications are hereby made part of this agree-
ment as fully and with the same effect as if the same had been set forth
at length in the body of this agreement.

In consideration of the premises the party of the first part hereby
agrees to pay to the party of the second part for said work, when com-
pleted in accordance with the said specifications, the sum of.....

.....payments to be made as provided in said specifications upon presentation
of the proper certificates of the engineer and supervisor and upon the
terms set forth in the annexed specifications.

This contract to be binding upon THE BOARD OF CHOSEN FREE-
HOLDERS OF THE COUNTY OF.....their successors or
assigns, and upon.....

.....the party of the second part.....

COMMISSIONER OF PUBLIC ROADS. 159

In Witness Whereof, The Director of THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF.....by authority of a resolution of said Board, hath hereunto set his hand and affixed the corporate seal of the said Board and the said party of the second part ha.. hereunto set.....hand.. and seal.. the day and year first above written.

.....
Director of the Board of Chosen Freeholders
of the County of.....

Signed, sealed and delivered in the presence of

This contract approved this.....day of.....190

.....
State Commissioner of Public Roads.

KNOW ALL MEN BY THESE PRESENTS, That we.....
and.....of the County
of.....and State of New Jersey, are held and firmly bound
unto THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF
.....in the sum of.....
.....dollars, lawful money of the United States, to be paid to the
said THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF
.....their successors or assigns, to which payment well
and truly to be made, we bind ourselves, our heirs, executors and adminis-
trators, jointly and severally, firmly by these presents.

Sealed with our seals and dated this.....day of
.....A. D. nineteen hundred and.....

TENTH ANNUAL REPORT.

The Condition of this Obligation is such, That if the above-bounden
.....
shall well and truly perform his part of the contract hereto annexed, and
all the covenants and conditions therein perform, then this obligation to
be void, otherwise to remain in full force and virtue.

.....
.....
.....
.....

Signed, sealed and delivered in the presence of

.....

This Bond approved this.....day of.....A. D. 190

.....

Director.

Be it Remembered on this.....day of
.....in the year of our Lord one thousand nine hundred and
.....before me, a Master in Chancery of the State of New Jersey,
personally appeared.....
and.....
who acknowledged that they signed, sealed and delivered the foregoing
bond as their voluntary act and deed for the uses and purposes therein
expressed.

.....

JUSTIFICATION OF SURETY.

State of New Jersey, }
County of..... } ss.

On this.....day of.....
A. D. 190..before me, a Notary Public in and for the County and State
aforesaid, personally appeared.....

.....
who, being duly sworn, on his oath declares that he is a resident of the
County of.....in the State of New Jersey; that he is a
freeholder in said County, and that he owns real estate in said County, in
his own right, to the amount of.....
.....

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over and above all his indebtedness and after all his debts are paid, and over any contingent liability by reason of being bail, surety, endorser or guarantor.

Subscribed and sworn to before me, this.....day of.....
A. D. 190.. I hereby certify that the contents of the above have been carefully made known to affiant before execution.

.....

State of New Jersey, }
County of..... } ss.

On this.....day of.....
A. D. 190..before me, a Notary Public in and for the County and State aforesaid, personally appeared.....

.....
who, being duly sworn, on his oath declares that he is a resident of the County of.....in the State of New Jersey; that he is a freeholder in said County, and that he owns real estate in said County, in his own right, to the amount of.....

.....
over and above all his indebtedness and after all his debts are paid, and over any contingent liability by reason of being bail, surety, endorser or guarantor.

Subscribed and sworn to before me, this.....day of.....
A. D. 190.. I hereby certify that the contents of the above have been carefully made known to affiant before execution.

.....

**Standard State Aid Specifications for Gravel Roads as Amended
by the State and County Road Engineers, February
1st, 1901, and Revised May 20th, 1903.**

SPECIFICATIONS.

For a GRAVEL ROAD in.....County, New Jersey, known
as.....
beginning at.....and
extending to.....
a distance of.....feet, or.....miles
.....feet wide and.....inches deep.

WORK TO BE PERFORMED.

1. The work to be performed will consist in furnishing all tools, machinery and labor necessary for the efficient and proper grading of roadway, side ditches and side banks; laying, spreading, and rolling of road material, and leaving the roadway complete in every manner ready for immediate use.

PLANS AND DRAWINGS.

2. The plan, profile and cross-sections on file in the office of the State Commissioner of Public Roads and at the office of.....County Engineer.....New Jersey, show general location profile, details and dimensions. The work will be constructed in all respects according to the above-mentioned plans, profile and cross-sections, which form part of these specifications.

3. Any variation of location, profile, size and dimensions from that shown on the plans, as may be required by the exigencies of construction, will, in all cases, be determined by the Engineer; but the contractor shall not, on any pretense, save that of the written order of the contracting parties, deviate from the intent of the plans or specifications.

4. On all drawings, figured dimensions are to govern in cases of discrepancy between scale and figures.

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GRADING.

5. Under this head will be included all excavations and embankments required for the formation of the highway; cutting all ditches or drains about or contiguous to the road; removing all fences, walls, buildings, trees, poles or other incumbrances, the excavation and embankment necessary for reconstructing cross or branch roads in cases where they are destroyed or interfered with in the formation of the roadway, and all other excavations and embankments connected with or incidental to the construction of the said road.

EXCAVATION.

6. The roadway to the width of.....feet as shown on plan must be excavated or built to the same curvature as that of the surface of the road when finished; the grade, from center to sides, must be as shown on plans.

7. The earth taken away from any cut or ditch shall be deposited where the Engineer may direct, either within or without the lines of the road, but no earth shall be removed from the line of the road without the order of the Engineer.

EMBANKMENT.

8. Material taken from the excavations, except when otherwise directed by the Engineer, shall be deposited in the embankments, either on the roadway or sidewalks.

9. When there is not sufficient material in the excavations of the road to form the embankments, the deficiency must be supplied by the contractor from without the road. The character of said material and place of excavation must be approved by the Engineer. Said material is to be paid for at the same price per cubic yard as specified in the contract for other excavation.

10. The embankments will be formed in layers of such depth, generally twelve (12) inches, and the material deposited and distributed in such manner as the Engineer may direct, the required allowance for settling being added.

SLOPES.

11. Slopes in both embankment and excavation shall be one and one-half ($1\frac{1}{2}$) horizontal to one (1) vertical, unless otherwise ordered by the Engineer.

ROADWAY.

Sub-Foundations.

12. When the excavations and embankments have been brought proper depth below the intended surface of the roadway, the cross-section conforming in every respect to the cross-section of the road finished, the same shall, if ordered by the Engineer, be rolled approved by him. If any depressions form under such rolling, or to improper material or vegetable matter, the same shall be removed and good earth substituted, and the whole re-rolled until thoroughly and to above-mentioned grade.

SHOULDERING.

13. A shoulder of firm earth or gravel is to be left or made on side of the gravel-bed, extending at the same grade and curvature road to side ditches or gutters. This shoulder is to be rolled according to the directions of the Engineer.

UNDERDRAINS.

14. Underdrains, if found necessary, shall be constructed by the tractor (at prices named in bids) of good.....inch.....tile upon a board of not less than one (1) inch in thickness and six (6) inches in width, whenever and wherever the Engineer shall decide; top of or pipe must be at least.....inches deep, unless otherwise directed by the Engineer; the joints of the tile or pipe must be covered with hay, or material equally as good, and trench filled with pervious earth.

15. When directed by the Engineer a stone drain may be used instead of the tile drains. A trench one foot in width and one foot six inches depth shall be excavated below the sub-grade, said excavation to be filled with loose broken stone to a depth required by the Engineer.

MATERIAL.

16. The material to be used in surfacing the road is to be furnished the.....without any cost to.....

17. The Road Committee, in conjunction with the Engineer, subject to the approval of the Board of Chosen Freeholders, will pass upon and approve all gravel to be used in surfacing the road. The contractor shall dig, cart and place upon the road, in accordance with the specifications, the gravel selected and use no other. Should any objectionable material be used, he is to remove the same at his own expense.

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18. The contractor must furnish to the Engineer samples of the kind of gravel to be used in the work before the opening of the bids.

19. The gravel is to be placed upon the road in such manner as shall be approved by the Engineer, and be thoroughly rolled and solidified until it is consolidated, firm and approved by the Engineer. The gravel shall be of such thickness that when it is thoroughly compacted and approved, it shall be.....inches deep in the center and slope at a regular grade to.....inches in depth at a distance of.....feet on each side of the center line.

20. Should any depressions appear these are to be carefully filled with gravel, so that the finished road will conform to the approved profile.

21. The contractor is to be paid by the cubic yard, as per depths above named, for the compacted gravel that he puts on the road, at the price named in the accepted bid, which shall include finishing the road and shaping the shoulders as above specified.

22. The contractor is to place sufficient gravel on the road to allow it to shrink thirty-three per cent. in rolling and settling.

OVERHAULS.

(This only to apply when county furnishes the gravel.)

23. The contractor will not be required to cart any gravel a greater distance than one-half mile without extra pay for each extra half mile of carting or fraction thereof, at a price per compact cubic yard named in his accepted bid.

24. All gravel used for surfacing found within one-half mile of the place where it is to be used, whether on the line of the road or not, must be carted without extra pay.

SIDEWALK.

25. The contractor will also be required, when the Engineer so directs, to grub and remove from a strip of land.....feet on outside of curbs-lines all material objectionable to the Engineer, such as trees, stumps, roots and brush, and refill the holes with earth, thereby completing the opening of the entire road to a width of.....feet, which shall befeet on each side of the center line.

26. The grubbing and removing of such objectionable material that is ordered by the Engineer shall be styled as "grubbing," and paid for by the acre at price named in accepted bid.

STRIPPING GRAVEL BEDS.

(This only to apply when county furnishes gravel.)

27. Some of the gravel beds are covered with objectionable surface material which must first be removed by the contractor and deposited

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within one-half mile, where the Engineer so directs, which shall be paid for by the county at a price per cubic yard named in accepted bid for removing or stripping such objectionable material from top surface of gravel-bed. No allowance will be made for removing stumps, trees, brush or roots from gravel-pit.

OPEN DITCHES.

28. The contractor is to grade the shoulders and open all necessary side ditches (as per stakes furnished by the Engineer) so that there will be no water allowed to stand by the side of the road or upon it, for which no extra payment will be allowed.

EXTRA DEEP.

29. Should the Road Committee so order, the contractor is to build in all respects, as already specified, the gravel-bed to a greater depth or thickness than that already named. The contractor is to do the same at a price named per square yard for each extra inch in depth.

NO EXTRA PRICE.

30. No allowance in measure of depth of pavement will be made on account of any material which may be driven into the roadbed by rolling. The pavement, when completed, must conform to the grade and cross-section and be satisfactory to the Engineer, whose decision shall be final.

31. No extra work will be paid for unless the price has been agreed upon between the contracting parties, including the State Commissioner of Public Roads, and endorsed upon the agreement, witnessed by the Engineer.

BROAD TIRE WAGONS.

32. All wagons and carts used during the construction for hauling stone, earth or any other material must have tires not less than three and one-half ($3\frac{1}{2}$) inches in width.

BIDS.

33. Bids will be received under these specifications for the road complete as follows:

- (1) Price per cubic yard for earth excavation, without classification, as per plans and cross-sections throughout the length and width of the road.

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- (2) Price per acre for grubbing and removing objectionable material from sidewalks.
- (3) Price per lineal foot for completed tile drain.
- (4) Price per cubic yard for compacted gravel as specified.
- (5) Price per cubic yard for carting gravel more than one-half mile and each additional half mile or fraction thereof.
- (6) Price per cubic yard for stripping or removing earth from top of gravel bed.
- (7) Price per square yard for each ordered inch in depth in excess of thickness named.
- (8) Price (lump) for the whole road complete, according to the specifications and plans prepared by the Engineer.

No bid will be received in which all the above items are not filled out.

Items Nos. 5 and 6 only to apply when county furnishes gravel.

The person bidding the lowest on the aggregate of above propositions will be considered the successful bidder (all other things being equal).

ESTIMATE OF QUANTITIES.

- 34. (1) Earth excavation.....cubic yards.
- (2) Grubbing.....acres.
- (3) Tile drain.....lineal feet.
- (4) Compacted gravel.....cubic yards.
- (5) Overhauls.....cubic yards.
- (6) Stripping.....cubic yards.
- Total estimated cost of the road, \$.....

35. These quantities are the result of calculation, but are to be considered as approximate. The county will not be responsible for any excess in above quantities, should any occur. The contractor is expected to satisfy himself, by a personal examination of the work contemplated, about the nature, character and quantity of the labor and material required.

CHECK ACCOMPANYING BIDS.

36. Bids shall be accompanied by a certified check, payable to the Director of the Board of Chosen Freeholders, for the sum of One Thousand (\$1,000) Dollars, as a guarantee that if the contract shall be awarded to him he will, when required by said Board, execute an agreement in writing to perform the work according to the specifications, and upon failure by the contractor to enter into said agreement with the said Board of Chosen Freeholders, said certified check shall be forfeited and considered as liquidated damages.

LIABILITIES OF CONTRACTOR.

37. He shall keep up sufficient guards by day and night to prevent accidents from travel, and will be liable for any damage which may arise from his neglect to do so, or from any omission on his part.

38. He is to commence and prosecute the work upon the road at such points as may be directed by the Engineer, within.....days from and after the signing of the contract, and shall continue work thereon until completion, except as herein provided.

39. He further agrees to complete the same on or before the..... day of.....A. D.....

40. Twenty dollars for each day that the work shall remain uncompleted, after the time allowed by contract, may be deducted, as liquidated damages, from any moneys due contractor, unless otherwise agreed upon by the Board of Chosen Freeholders, after presentation of certificate of the Engineer recommending the extension of the time limit of completion. A bonus or premium of one dollar per week will be paid the contractor for each week the road is completed before the time specified in the contract.

41. The contractor shall keep the finished roadway and earthwork in repair for the period of one year from the date of its completion and acceptance, during which time he shall be liable for wear and tear caused by ordinary travel, and in addition thereto, for as much longer as for any period or periods during said year it shall be out of proper condition. If, during that time, the roadway or any part of the work shall, in the judgment of the Engineer and the Board of Chosen Freeholders, require repairing, and they shall duly notify the contractor to make such repairs as required, and the contractor should refuse or neglect to do so to the satisfaction of the said Engineer and Board of Chosen Freeholders, within five days from the date of service of notice, then the said Engineer and Board of Chosen Freeholders shall have the right to have the work done properly by other parties and pay the expense for the same out of the five per cent. retained.

42. The contractor will be required to preserve all stakes and benchmarks made and established on the line of work until duly authorized by the Engineer to remove the same.

43. The contractor shall not disturb the position of title-stones (the corners of properties adjacent to the road), but where they appear he will either lift or lower them, under the personal supervision of the Engineer.

44. The contractor must also preserve the roadway on which he is working from needless obstruction, and where necessary construct safe and commodious crossings, to be maintained in good order. He shall afford all proper and reasonable means for the accommodation of the public, and leave the roadway complete in every manner ready for immediate use.

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PROVISION FOR DRAINAGE.

45. If it is necessary in the prosecution of the work to interrupt or obstruct the natural drainage of the surface, or the flow of artificial drains, the contractor shall provide for the same during the progress of the work in such a way that no damage shall result to either public or private interests. He shall be held liable for all damages which may result from any neglect to provide for either natural or artificial drainage, which he may have interrupted.

RIGHT TO BUILD BRIDGES, CULVERTS, ETC., AND SUSPENSION OF WORK.

46. The right of the county to build bridges, culverts, lay pipes or other appurtenances in said road during the progress of the work as well as suspending the work or any part thereof during the construction of the same, for the purposes above stated, is expressly reserved, without further compensation to the contractor for such suspension than an extension of time for completing the work as much as it may have been delayed by such suspension.

STOPPING WORK ON ACCOUNT OF WEATHER.

47. The Engineer or Supervisor may stop any portion of the work if in their judgment the weather is such as to prevent the same being done properly. No allowance of any kind will be made for such stoppage, except an extension of the time for the completion of the work as herein provided.

ABANDONMENT OF CONTRACT.

48. If at any time the work under contract should be abandoned, or if at any time the Engineer should judge and so certify in writing that said work, or any part thereof, is unnecessarily delayed, or that the contractor is willfully violating any of the conditions or covenants of this contract, or is executing the same in bad faith, then, and in that case, the Board of Chosen Freeholders shall notify the said contractor to discontinue all work under this contract. They may employ other parties to complete the work in such manner as they may decide, and use such material as may be procured upon the line of aforesaid work, and, if necessary, to procure other material for its completion, and charge the expense of the said labor and material to the contractor, which expense shall be deducted from any moneys due him under contract. In case these expenses shall exceed the sum which would have been payable under

contract, if the same had been completed by said contractor, he or his bondsmen shall pay the amount of the excess to the Board of Chosen Freeholders, on notice from the Engineer.

ENGINEER.

49. The Engineer is to be selected or appointed by the Board of Chosen Freeholders and paid by them. He is to furnish all surveys, profiles, plans, specifications and estimates of quantities of all kinds before specifications are signed, and in such a clear manner that lump bids can be made upon the work. He shall furnish all lines and grades required for the completion of the work. He is also to furnish estimates for quantities of work done before partial payments can be made, the quantity of road laid being determined by surface measurements. Should any difference arise between the contracting parties hereto in connection with this contract and the work to be done under it, the same shall be referred to the County Engineer and his decisions on these matters are to be final and conclusive. The work is to be done according to his directions, and if any material of which he does not approve is brought upon the road, it is to be removed at the expense of the contractor. If the contractor fails or neglects to do any part of the work as specified or as directed by the Engineer, then in that case all other work shall be discontinued on notice from the Engineer to the contractor, or to the superintendent or foreman in charge of the work for the contractor, until such time as the work complained of has been done to the satisfaction of the Engineer; and the contractor will not be entitled to or allowed any compensation or extension of time for such discontinuation or suspension of the work.

SUPERVISOR.

50. Nothing in these specifications relating to the duties of the Engineer shall be taken or construed in any manner to conflict with the duties of the Supervisor, as specifically set forth in the act entitled "An act to provide for the more permanent improvement of the public roads of this State," approved April 1, 1903, and the acts supplementary thereto, but they shall co-operate as far as practicable.

INCOMPETENT WORKMEN.

51. The contractor shall employ competent men to do the work, and whenever the Supervisor shall inform him, or his representative in charge, in writing, that any man on the work is unfitted for the place, or is working contrary to the provisions of the specifications or the instructions of the Engineer and Supervisor, he shall thereupon be discharged.

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INSPECTION.

52. All directions and determinations necessary to give due and full effect to any of the provisions of these specifications shall be given by the Engineer and Supervisor.

53. All material and workmanship of any kind shall be subject at all times to the inspection of the Engineer and Supervisor. Whenever unfaithful and imperfect work is discovered, it shall be immediately repaired or replaced by the contractor, after due notification from the Engineer and Supervisor.

SUB-LETTING OF CONTRACT.

54. The contractor shall not assign or sub-let any portion of this contract without the consent of the Board of Chosen Freeholders and the State Commissioner of Public Roads.

PAYMENTS.

55.monthly payments will be made by the Board of Chosen Freeholders to the contractor for work performed, upon presentation by him of the proper certificates of the Engineer and Supervisor in a sum not to exceed eighty per cent. of the amount then due, together with releases from all liens, if required. Fifteen per cent. will be paid at the completion of the work. The remainder or five per cent. will be retained by the Board of Chosen Freeholders for a period of one year, or until the road is finally approved as hereinbefore set forth.

BOND OF CONTRACTOR.

56. The contractor will be required to execute, within thirty days of giving of contract, a bond in such sum and with such securities as shall be approved by the Board of Chosen Freeholders, conditioned for the faithful performance of the contract, to indemnify and save harmless the said Board of Chosen Freeholders from all suits or actions of any name or description brought against them on account of any act or omission of the contractor or his agents, and for the faithful performance of the contract by the contractor. Said bond shall be in a sum of not less than the estimated cost of the road when completed. Any change made in said plans, specifications, agreements or quantities without the consent of the bondsmen shall in on way vitiate said bond. The said contractor hereby further agrees that so much of the money due him, under and by virtue of this agreement, as shall be considered necessary by the Board of Chosen Freeholders, may be retained by them until all such suits or claims for damages aforesaid shall have been settled, and evidence to that effect furnished to the satisfaction of the said Board of Chosen Freeholders.

COMMISSIONER OF PUBLIC ROADS.

PROPOSAL.

To the Board of Chosen Freeholders of the County of.....State of New Jersey:

Gentlemen—The undersigned hereby declare..that..he..ha..carefully examined the annexed specifications and the drawings therein referred to, and will provide all necessary machinery, tools, apparatus and other means of construction, and do all the work and furnish all the material called for by said specifications, in the manner prescribed by the specifications and the requirements of the Engineer and Supervisor under them for the following prices:

- (1) Price per cubic yard for earth excavation, without classification, as per plans and cross-sections, throughout the length and with of the road.....per cubic yard.
(2) Price per acre for grubbing and removing objectionable material from sidewalks.....per acre.
(3) Price per lineal foot for completed tile drain....per lineal foot.
(4) Price per cubic yard for compacted gravel as specified.....per cubic yard.
(5) Price per cubic yard for carting gravel more than one-half mile and each additional half mile or fraction thereof.....per cubic yard.
(6) Price per cubic yard for stripping or removing earth from top of gravel bed.....per cubic yard.
(7) Price per square yard for each ordered inch in depth in excess of thickness named.....per square yard.
(8) Price (lump) for the whole road complete, according to the specifications and plans prepared by the Engineer.....

Accompanying this proposal is a certified check for the sum of one thousand (\$1,000) dollars, payable to the order of the Director of the Board of Chosen Freeholders of.....county; which check is to be forfeited as liquidated damages if, in case this proposal is accepted, the undersigned shall fail to execute a contract with said Board of Chosen Freeholders, under the conditions of this proposal, within the time provided for by the foregoing advertisement for proposals; otherwise, said check is to be returned to the undersigned.

Signed.....

Address.....

.....N. J.....

TENTH ANNUAL REPORT.

CONTRACT.

This agreement, made the.....day ofin the year of our Lord one thousand nine hundred.....between THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF.....party of the first part, and.....party of the second part.....

Witnesseth, That the said party of the second part, for and in consideration of the payments hereinafter specified and agreed to be made by the party of the first part, hereby covenant and agree to furnish and deliver all the materials and to do and perform all the work and labor required to be furnished and delivered, done and performed in and about the macadamizing of.....

beginning at.....and extending to.....in the township of.....a distance of.....

in strict and entire conformity with the plans on file in the engineer's office and with the specifications hereto annexed and duly approved by resolution of THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF.....

adopted the.....day of.....in the year of our Lord one thousand nine hundred.....and approved by the State Commissioner of Public Roads on the.....day of.....in the year of our Lord one thousand nine hundred.....

which said plans and specifications are hereby made part of this agreement as fully and with the same effect as if the same had been set forth at length in the body of this agreement.

In consideration of the premises the party of the first part hereby agrees to pay to the party of the second part for said work, when completed in accordance with the said specifications, the sum of.....payments to be made as provided in said specifications upon presentation of the proper certificates of the engineer and supervisor and upon the terms set forth in the annexed specifications.

This contract to be binding upon THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF.....their successors or assigns, and upon.....the party of the second part.....

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In Witness Whereof, The Director of THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OF.....by authority of a resolution of said Board, hath hereunto set his hand and affixed the corporate seal of the said Board and the said party of the second part ha. hereunto set.....hand..and seal..the day and year first above written.

..... Director of the Board of Chosen Freeholders of the County of.....

Signed, sealed and delivered in the presence of

This contract approved this.....day of.....190 .

..... State Commissioner of Public Roads.

KNOW ALL MEN BY THESE PRESENTS, That we.....

and.....of the County of.....and State of New Jersey, are held and firmly bound unto THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OFin the sum of.....dollars, lawful money of the United States, to be paid to the said THE BOARD OF CHOSEN FREEHOLDERS OF THE COUNTY OFtheir successors or assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors and administrators, jointly and severally, firmly by these presents.

Sealed with our seals and dated this.....day ofA. D. nineteen hundred and.....

The Condition of this Obligation is such, That if the above-bounden shall well and truly perform his part of the contract hereto annexed, and all the covenants and conditions therein perform, then this obligation to be void, otherwise to remain in full force and virtue.

.....
.....
.....
.....

TENTH ANNUAL REPORT.

Signed, sealed and delivered in the presence of

.....

This Bond approved this.....day of.....A. D. 190

.....

Director.

Be it Remembered on this.....day of
.....in the year of our Lord one thousand nine hundred and
.....before me, a Master in Chancery of the State of New Jersey,
personally appeared.....
and.....
who acknowledged that they signed, sealed and delivered the foregoing
bond as their voluntary act and deed for the uses and purposes therein
expressed.

.....

JUSTIFICATION OF SURETY.

State of New Jersey, }
County of..... } ss.

On this.....day of.....
A. D. 190..before me, a Notary Public in and for the County and State
aforesaid, personally appeared.....
.....
who, being duly sworn, on his oath declares that he is a resident of the
County of.....in the State of New Jersey; that he is a
freeholder in said County, and that he owns real estate in said County, in
his own right, to the amount of.....
.....
over and above all his indebtedness and after all his debts are paid, and
over any contingent liability by reason of being bail, surety, endorser or
guarantor.

Subscribed and sworn to before me, this.....day of.....
A. D. 190.. I hereby certify that the contents of the above have been
carefully made known to affiant before execution.

.....

COMMISSIONER OF PUBLIC ROADS.

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State of New Jersey, }
County of..... } ss.

On this.....day of.....
A. D. 190..before me, a Notary Pubile in and for the County and State
aforesaid, personally appeared.....
.....
who, being duly sworn, on his oath declares that he is a resident of the
County of.....in the State of New Jersey; that he is a
freeholder in said County, and that he owns real estate in said County, in
his own right, to the amount of.....
.....
over and above all his indebtedness and after all his debts are paid, and
over any contingent liability by reason of being bail, surety, endorser or
guarantor.

Subscribed and sworn to before me, this.....day of.....
A. D. 190.. I hereby certify that the contents of the above have been
carefully made known to affiant before execution.

.....



Neshanic road, Somerset Co., before improvement.



Neshanic road, Somerset Co., after improvement.

APPENDIX B.

An act to provide for the permanent improvement of public roads in this state, approved April 1, 1903.

CHAPTER 97.

An Act to provide for the permanent improvement of public roads in this state.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. The board of chosen freeholders of any county in this state may, at any time, by resolution, direct that any public road or section of road, located within said county, being at least one mile in length, or, being less than one mile in length, is an extension of or connection with some permanently improved or paved road or street, be improved by the construction of a macadamized road, or a telford or other stone road, or a road constructed of gravel, oyster shells or other good materials, in such manner that the same, of whatever materials constructed, shall, with reasonable repairs thereto, at all seasons of the year, be firm, smooth and convenient for travel; or whenever a road is petitioned for by the owners of two-thirds of the lineal feet along said road praying the board to cause such road to be improved under this act, it shall be the duty of the board to cause such improvement to be made in the same manner and under the same conditions as by resolution; when more roads are applied for than can be constructed in any one year, the boards of chosen freeholders and state commissioner of public roads shall have power and authority to select from the roads petitioned for the ones first to be constructed, having

Permanent improvement of roads.

When petitioned.

Selection of roads.

Township's
share.

first regard to the most important roads and the distribution of the benefits of this act to all parts of their counties; the board of chosen freeholders may, before approval of any road, require as a condition of said approval that the township or townships or other municipality, through which said road runs shall pay ten per centum of the cost of said improvement, said payment to be applied to the improvement of roads constructed under this act.

Surveys.

2. The said board, after the passage of the resolution or acceptance of the petition as aforesaid, shall cause a survey of said road so to be improved to be made and plans and specifications of the work to be done on the same to be prepared; the survey shall indicate the width and length of said road and shall also show how much of said road may be improved by deviation from the then existing lines; when the said plans and specifications shall have been prepared, they shall be submitted to the board of freeholders for its approval or rejection; if such board shall approve the same they shall then be submitted to the state commissioner of public roads for his approval or rejection, whose duty it shall be, before approving of said plans and specifications, to ascertain by personal inspection or otherwise, the natural character of the soil upon which such road is proposed to be constructed, and any and all other facts that he may deem important, and if, after examination of the plans and specifications and an inspection of the road, as aforesaid, he shall be satisfied as to the advisability of the improvement of the road as contemplated, and that one-third of the cost of the construction of said road, together with one-third of the cost of the construction of all other roads or sections of roads in this state under plans and specifications previously approved by him, will not in any one year exceed the sum of four hundred thousand dollars, then he shall approve said plans and specifications, otherwise he shall reject the same.

Approval of
plans by
freeholders.

By commis-
sioner of roads.

Amount.

Advertise-
ment for bids.

3. After the approval of the plans and specifications by the commissioner of public roads, it shall be the duty of the board of chosen freeholders to advertise for bids

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for said work in two or more of the public papers printed in said county, and in at least one engineering journal published in the city of New York, for three weeks successively, at least once in each week, which said advertisement shall state the place where bidders may examine said plans and specifications and the time and place where bids for said work will be received by the board of chosen freeholders, or committee of said board; each bidder must accompany his bid with a certified check, payable to the director of the board of chosen freeholders, for one thousand dollars, as a guarantee that if said work is awarded to him he will enter into a contract with said board for the same, which contract must be executed, together with a bond of the successful bidder, in the penal sum of at least the estimated cost of said work, with two or more sureties, freeholders of the county, or a surety or trust company created by this state, or a surety or trust company of another state authorized to transact business within this state, to be approved by the director of the board of chosen freeholders, conditioned for the faithful performance of said work in strict conformity with the plans and specifications for the same, within thirty days from the awarding of the contract, or such further time as said board shall grant, which contract, before any work is done thereunder, must be exhibited to the state commissioner of public roads for his approval, in writing, thereon, and said commissioner is hereby authorized, whenever in his judgment the best interests of the county require him so to do, to reject the same, in which case he shall write upon said contract the word "rejected" and append thereto his signature and official title of office, and said contract and the bond required to accompany the same shall, from the time of such rejection, be absolutely null and void, but such rejection shall in nowise operate to prevent said board from re-advertising for bids and proceeding thenceforth under the provisions of this act; the time and manner of payment for work done under any contract awarded under this act shall be set forth in said contract, and at least five per centum of

Check accompanying bid.

Sureties.

Contract; may be rejected.

Freeholders may re-advertise.

the contract price shall not be paid to the contractor until after the expiration of one year from the completion of the work.

Limit to amount of contracts.

4. The estimated amount of all contracts for road improvements awarded in any one year by the board of chosen freeholders, together with the estimated cost of repairs of roads already constructed, shall not exceed one-half of one per centum of the ratables of the county, as reported to the state comptroller for the preceding year, exclusive of the state appropriation for road purposes apportioned to any county.

Anticipation of appropriation.

5. The board of chosen freeholders may, in order that contracts for road improvements may be entered into and the work completed in time to receive the state's annual appropriation for road purposes, anticipate the appropriation to be made from the annual tax levy and award contracts for road improvements.

Papers filed with commissioner of roads

6. A true copy of the survey, contract, plans and specifications for road improvements, certified to be such by the director of the board of chosen freeholders, shall, immediately after the awarding of any contract, be furnished by the board of freeholders to the state commissioner of public roads, to be filed and remain of record in the office of such commissioner.

Supervisor.

7. Immediately after the awarding of any contract under the provisions of this act the state commissioner of public roads shall appoint a competent supervisor to take charge of the work required to be performed under said contract, who shall receive for his services the sum of three dollars per day; such supervisor, before assuming the duties of his office, shall make and subscribe an oath or affirmation, before any officer authorized to administer the same, that he will faithfully and to the best of his ability and understanding perform all the duties of his office; the state commissioner of public roads may summarily discharge any supervisor who, in his judgment, is incompetent or negligent in the performance of his duties, and may appoint a new supervisor in the place of the one so discharged; where any contract provides

Pay; oath; removal.

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for partial payments based upon the amount of work done it shall be the duty of such supervisor, as each payment becomes due, to present to the board of freeholders his certificate, and also the certificate of the engineer, in which certificate shall be stated, as near as can be, the amount of work done for which payment is to be made, and that the same has been done, in all respects, in strict conformity with the contract and plans and specifications; when the work done under any contract shall have been fully completed, the supervisor and engineer shall prepare a detailed and itemized statement, in quadruplicate, of the cost of the improvement, one copy whereof shall be filed with the board of freeholders, one with the clerk of the county and two with the state commissioner of public roads.

Partial payments to contractor.

Reports filed upon completion of work.

8. One-third of the cost of all roads constructed under this act, not exceeding in any one year the sum of four hundred thousand dollars, shall be paid out of the state treasury, out of any moneys not otherwise appropriated, if the same be first appropriated in the annual appropriation act; the governor and state commissioner of public roads shall, between December fifteenth and thirty-first of each year, certify to the state comptroller the amount to be paid to any county for such year, and the state comptroller shall draw his warrant on the state treasurer in favor of the county collector of such county for the amount so certified, and the state treasurer shall thereupon pay the same.

State's proportion, one-third.

9. On or before the day fixed by law for the meeting of the county board of assessors in any county in each year the board of chosen freeholders of such county shall certify to the said county board of assessors, either in the annual tax budget or separately, two-thirds of the estimated cost of all work contracted for under the provisions of this act since the day fixed by law for the meeting of the board of assessors in the year next preceding; and the county board of assessors shall include in their assessment of county taxes the sum so certified, and the same shall be collected and paid over to the county in

Two-thirds to be raised by county; notice to assessors.

If deficiency	<p>the same manner and at the same time that other county taxes are collected and paid over; if a deficiency shall exist in consequence of the cost exceeding the estimate, or in consequence of the receipt of less than one-third of the cost from the state, the board of chosen freeholders shall have authority to borrow, on temporary loans, such deficiency until the next annual taxes shall be collected and paid over to the county and until the full amount due said county from the state shall have been paid; if there be a surplus, by reason of the estimate exceeding the cost, the same shall be retained and used in the construction of other roads under this act, or in repairs to roads constructed under this act.</p>
Temporary loans.	
If surplus.	
May issue bonds instead of taxation.	<p>10. The board of chosen freeholders may, instead of certifying to the county board of assessors the two-thirds cost of any work done under this act, as required by the ninth section of this act, by resolution, adopted by a vote of at least two-thirds of all its members, issue bonds of the county for two-thirds of the estimated cost of said work, which bonds shall be designated as "road improvement bonds," and shall be for such sums and in such amounts, payable in not less than six nor more than thirty years from date thereof, with interest at a rate not exceeding five per centum per annum, payable annually, as said board of freeholders, by said resolution, may determine; said bonds shall be signed by the director of the board of chosen freeholders and by the county collector, sealed with the seal of the board, properly numbered, and a registry thereof kept by the board, and may be either coupon or registered bonds, and, if coupon bonds, the coupons shall be signed by the director of the board, and shall be numbered to correspond to the several bonds to which they shall be severally attached; the board of freeholders shall, when bonds are issued under the provisions of this section, certify to the county board of assessors, in each and every year so long as any of said bonds remain outstanding, a sum sufficient to pay the interest accruing on said bonds for said year and the principal of any bond or bonds that shall mature in said</p>
Designation, time, rate.	
Principal and interest.	

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year, and the said county board of assessors shall include the said sum in the annual tax levy or assessment for said year, and the same shall be collected and paid over in the same manner and at the same time as other county taxes.

11. Any road constructed under the provisions of this act, except within the limits of any city, shall forever thereafter be a county road, and the duty of keeping the same in repair, except within the limits of any city, shall devolve exclusively upon the board of chosen freeholders; if any such road shall become out of repair, except such portions thereof as may lie within the limits of any city, and shall not be repaired within sixty days after notice so to do, given by the state commissioner of public roads to the board of chosen freeholders, or to its director, the said commissioner of public roads shall certify such neglect or refusal to the state comptroller, who shall withhold payment to such county of any moneys already appropriated, or that may thereafter be appropriated, to such county by the state, and no payment shall be made to said county until the state commissioner of public roads shall certify to the state comptroller that said road has been placed in a good state of repair.

County roads,
their care, &c.

Moneys with-
held for
neglect.

12. After the first road shall have been constructed under this act in any county, it shall be the duty of the board of chosen freeholders to appoint some suitable person as county supervisor of roads, who, before assuming the duties of his office, shall make and subscribe an oath or affirmation that he will faithfully perform all the duties of his office to the best of his ability and understanding; such supervisor shall hold his office for three years and until his successor is appointed and qualified; shall give bond to the board of chosen freeholders in the penal sum of one thousand dollars, conditioned for the faithful performance of the duties of his office, with such surety or sureties as the board shall approve, and shall receive such compensation for his services as the said board shall determine; the board of chosen freeholders shall

County
supervisor of
roads.

Bond, surety,
compensation.

Maintenance
of roads.

appropriate all moneys necessary to keep any and all roads constructed under this act, except within the limits of any city, in good repair, and if the board shall have no money which may be lawfully used for repairs, it shall have the power to borrow the same, on the credit of the county, until the next annual taxes shall have been levied and collected; the cost of all repairs shall be paid by the county collector upon the order of the board of chosen freeholders, and all bills for repairs shall be verified by affidavit and shall be certified to be correct by the county supervisor of roads; any portion of any public road improved under the provisions of this act which may lie within the limits of any city shall forever after such improvement be kept in repair by such city, and such city shall have the same power, authority and jurisdiction over such portion of said road as shall lie within the limits of such city, as such city had before the passage of this act, or as may hereafter be conferred by law.

When road in city.

Acquirement of lands.

13. Whenever it is deemed advisable by the board of chosen freeholders of any county of this state to acquire land for the purpose of widening, changing or straightening any road to be improved under the provisions of this act, said board is hereby authorized to agree with the owner or owners of any land or lands required for that purpose as to the compensation to be paid by said board for a conveyance of said land or lands, and to make compensation therefor out of any moneys applicable for road improvement purposes, or, if there be no money on hand for such purpose, said board may borrow the necessary sum or sums, on temporary loans, on the credit of the county, until the next annual taxes shall have been levied and collected; in

Compensation.

Condemnation.

case said board cannot agree with the owner or owners of any land for the acquisition of the same by the said board for road improvement purposes, said board shall have the power to acquire said land by condemnation in the manner prescribed by law, and shall have authority and power to pay all necessary costs and expenses from any moneys applicable for road improve-

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ment purposes, or may borrow so much as may be necessary on temporary loans, on the credit of the county, until the next annual taxes shall have been levied and collected; nothing in this act contained, however, shall be so construed as to prevent said board from acquiring any land for road improvement purposes by gift.

14. If all the owners of property abutting on any road or highway, in any county, which has not been improved, or is not undergoing improvement, desire said road, or any section thereof, to be improved, and shall certify, in writing, to the board of chosen freeholders, that they are willing to bear the entire expense of such improvement, the county supervisor of roads shall prepare plans and specifications for the work to be done on such road, or any section thereof, so to be improved, and shall submit the same to the owners, and if satisfactory to such owners they are hereby authorized to enter into contract for such work, said contract to be first submitted to the board of chosen freeholders for its approval; upon the completion of the work to the satisfaction of said supervisor and the board of freeholders, and upon the submission to said board of proper receipts showing full payment for all work done, the said board of freeholders may, by resolution, declare that said road, or any portion thereof, except within the limits of any city, be thereafter a county road; the location of any portion of said road may be changed, if deemed desirable, upon acquiring the consent, in writing, of the owner or owners of land abutting on such portion of road so to be changed and upon acquiring by gift the land necessary for such change; the said supervisor shall be paid the sum of twenty-five dollars for making the plans and specifications and supervising said work, to be paid by said owners.

When property owners bear entire expense.

15. Whenever any public road is sought to be improved under the provisions of the fourteenth section of this act, upon which road any lands or real estate owned by the state of New Jersey may front or border, the board of managers or other body having the control and

When road borders on state property.

management of said lands and real estate are hereby authorized to consent to the improvement of said road and to enter into contract for the same, in the manner directed by said section, and to pay for said improvement out of any moneys appropriated to said board of managers or other governing body.

Boundary
roads.

16. The provisions of this act shall extend to the improvement of any road, or section of road, constituting the boundary line between two counties, whenever said improvement shall be agreed to by the board of chosen freeholders of both counties.

Extension of
this act.

17. The provisions of this act shall extend to townships, towns, boroughs, villages or any municipality or municipalities, all proceedings conforming, as near as possible, to the provisions of this act, and the governing bodies of any township, town, borough, village or municipality shall have the same power and perform the same duties as are conferred and devolve upon the board of chosen freeholders under the provisions of this act.

Repealer.

18. All acts and parts of acts inconsistent with the provisions of this act be and the same are hereby repealed; *provided*, that this repealer shall not revive any act heretofore repealed, nor shall any proceeding for the improvement of any public road, entered into before the passage of this act, abate, but such proceeding shall continue, as near as may be, as if the same had been commenced hereunder.

Proviso.

19. This act shall take effect immediately.

Approved April 1, 1903.

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CHAPTER 239.

A Supplement to an act entitled "An act to provide for the permanent improvement of public roads in this state," approved April first, one thousand nine hundred and three.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. Wherever any road in this state runs in or through two or more counties, and said counties engage in the maintenance and operation thereof in its entirety, at joint expense, it shall and may be lawful for the boards of chosen freeholders of such counties, by resolution to be passed separately by each board, to declare their intention to cause such road, in its entirety, or any portion thereof, to be improved under the provisions of the above entitled act and the supplements thereto and amendments thereof as well as this supplement; and to cause all necessary surveys to be made and specifications to be prepared; and after said specifications shall be approved by such boards of freeholders, by resolutions passed separately by each board, the said specifications shall be certified to the state commissioner of public roads, for his approval or rejection, and if approved by him, such boards are authorized to appoint members from the board, to comprise a joint committee, to advertise for bids for said improvement; which bids shall be furnished in sealed envelopes and presented to the committee in open meeting, at the time called for in the advertisement, and the amount of each of said bids shall, in open meeting, be publicly announced, and thereafter the members of the committee from each county shall report the amount of the bids to their respective boards, with their recommendations, and the contract shall be awarded, on resolution of each board voting separately, to the lowest responsible bidder, who shall furnish satisfactory security, to be approved of by said boards; that the contract for such improvement shall specify the proportion of the

Joint improvement of roads.

Specifications and proposals.

Awarding contract.

Apportion cost.

- cost that each county will bear of said improvement, as between themselves, and neither county shall be liable for a greater amount than the proportion so specified; and the joint committee shall advertise for bids in at least two daily newspapers, printed and circulating in each county, for the period of two weeks, or in at least two weekly newspapers, printed and circulating in each of said counties, for at least four weeks; and all proceedings touching and concerning the improvement of such road shall conform as nearly as possible to the proceedings mentioned in the act to which this is a supplement, or any supplement thereto, or amendment thereof, except as modified by this act; and such counties taken together shall be entitled to receive one-third of the cost of the improvement set out in the specifications presented to the state road commissioner, as aforesaid, or as modified with his consent, in the manner specified in said act for the payment to any county for improving a road wholly within its limits; *provided, however*, that of said one-third so paid by the state each county shall receive the same proportion as it bears or is charged with on account of the cost of said improvement.
2. If in the opinion of either of such boards, to place in the tax levy for any one fiscal year the moneys necessary to pay for the work aforesaid, would be too burdensome on the taxpayers of such county, then, in order that each county may raise the funds wherewith to pay its share of the cost of such improvement, either board being of the opinion aforesaid may, by a resolution adopted by a vote of at least two-thirds of all its members, borrow such sum or sums of money as may be necessary for the payment of its share or proportion of such cost, by the sale of the bonds of such county, issued in the name of the board of chosen freeholders thereof, and in such sum as the board may deem proper, said bonds to bear interest at a rate not exceeding five per cent. per annum, and to be sold for not less than par, and said bonds shall not exceed in the aggregate the cost of the improvement to said board, and shall be so divided that one-tenth of the account of the bonds issued shall fall
- Advertising.**
- Proceedings.**
- State aid.**
- Proviso.**
- Meeting cost.**
- May issue bonds.**
- When payable.**

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due in one year from their date and one-tenth each succeeding year thereafter, for the period of ten years from their date, and shall be either coupon or registered bonds, as the board of freeholders may determine; the principal and interest thereof shall be made payable at the office of the county collector of such county; said bonds shall be signed by the director of such board and the county collector, and shall be sealed with the seal of the county, and the county collector shall keep a record thereof; it shall be the duty of the board of chosen freeholders each year to place in the tax levy for such county, in each year, so long as said bonds shall run, a sufficient sum to pay the interest accruing thereon for said year and the principal of the bonds that shall mature in said year.

Interest and
principal.

3. Whenever the character of the soil or foundation of any road, or any part thereof, sought to be improved, and the traffic over the same, are such that in the opinion of any board seeking the same, if the road lies wholly within one county, or in the opinion of the boards jointly engaged in the maintenance and operation of a road in its entirety, running through two or more counties, ascertained by resolution passed by such boards separately, for such purpose, it is necessary to build a foundation for such road and pave the same with a block or other substantial pavement other than that specifically mentioned in the first section of the act to which this is a supplement, it shall be lawful for such boards to include such work in the specifications for said work to be presented to the state commissioner of public roads as aforesaid.

Paving public
roads.

4. This act shall take effect immediately.

Approved April 8, 1903.

CHAPTER 231.

Supplement to an act entitled "An act to provide for the permanent improvement of public roads in this state," approved April first, one thousand nine hundred and three.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Cause portions of road to conform to altered grade.

1. Whenever any public road has been or shall hereafter be improved under the provisions of the act to which this is a supplement, and in the course of improving such road the grade of the roadbed shall have been or shall be changed so that it shall not conform to the grade of the remaining portion of the road, including the sidewalks, it shall be lawful for the municipal authorities of each municipality through which such road passes to cause the remaining portion of such road within the limits of their several municipalities to be graded and formed so as to conform in grade to that established for the roadway constructed under the provisions of the act to which this is a supplement, and to cause such work to be done under the same proceedings and in the same manner as may be provided by law in their several municipalities for the grading of the streets of such municipalities.

Proceedings.

Municipalities may improve road.

2. The proper municipal authorities of any municipality through which any such road may run shall have full power and authority to make any municipal improvement upon or within any such road within the limits of their several municipalities which may be authorized by law to be made in any of the other public streets or roads of such municipalities; *provided, however,* no such improvement shall be made by such municipal authorities which may in any way interfere with or impair the roadway improved under the provisions of the act to which this is a supplement without the approval and consent of the board of chosen freeholders of the county within which such road may be located.

Proviso.

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3. The cost and expense of any of the public improvements authorized by this act shall, so far as the same can be, be assessed upon the lands and real estate specially benefited by the improvement in proportion to the benefit received; and no lot or parcel of land shall be assessed more than it is so specially benefited, and such assessment shall be made in the same manner and under the same procedure as is directed by law for the making of other assessments for street improvements within every such municipality.

Assessment for benefits.

4. Nothing in this act contained shall be construed to in any way impose upon any such municipality therein referred to any part of the cost of the maintenance and repair of the roadway of any road improved under the provisions of the act to which this is a supplement.

Maintenance of road.

5. This act shall take effect immediately.

Approved April 8, 1903.

CHAPTER 61.

An Act to authorize the board of chosen freeholders of any of the several counties of this state to straighten, change the location of and vacate any portion of any public road or highway heretofore or hereafter acquired, constructed and improved in any such county by the board of chosen freeholders thereof, and to improve the portion included in such changed location; *provided*, any owner or owners of real estate along such portion is or are willing to contribute the whole cost and expense thereof; *and provided further*, every owner of land upon that part of said road proposed to be vacated under this act shall consent in writing to such change of location and vacation.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*:

1. The board of chosen freeholders of any of the several counties of this state shall have the power and

Change and improve roads.

- authority to straighten, change the location of and vacate any portion of any public road or highway heretofore or hereafter acquired, constructed and improved in any such county by the board of chosen freeholders thereof, and to improve the portion included in such changed location; *provided*, any owner or owners of real estate along such portion is or are willing to contribute the whole cost and expense thereof; *and provided further*, every owner of land upon that part of such road or highway proposed to be vacated under this act shall consent in writing to such change of location and vacation.
- Proviso.**
- Presentation by owners.** 2. The property owner or owners desiring such straightening, change of location and vacation, and the improvement of the portion included in such changed location, may present to the board of chosen freeholders of any such county a petition therefor, which shall be accompanied by a map and specifications showing the proposed straightening, change of location and vacation, and in what manner the portion included in such changed location is to be improved, and offering to contribute the whole cost and expense thereof; and said board, if it approve of the same, and is satisfied that every owner of land upon that part of said road or highway proposed to be vacated consents thereto, shall authorize the same; and thereupon it shall be lawful for said board to acquire the land necessary for said change of location, by gift, grant for nominal consideration, or by exchange of said portion so vacated for said portion necessary to be acquired; and said board is empowered, if required in any such exchange, to make, execute and deliver a deed or deeds of conveyance, conveying in fee-simple the title, if any, of any such board to the land so conveyed by it; and it shall be further lawful for said board, upon such terms as it shall determine or as shall be agreed upon with such owner or owners, either to proceed and make the said improvement itself, the whole cost and expense thereof to be paid by said owner or owners, or to allow the said owner or owners to make the same themselves, subject to the approval of said board, and after the com-
- Map and specifications.**
- Power of freeholders.**

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pletion of the same, the portion which shall be superseded by said changed location shall be deemed and taken as vacated as a part of said county or public road or highway.

3. All acts and parts of acts inconsistent with this act be and the same are hereby repealed, and this act to be deemed and taken as a public act, to take effect immediately. Repealer.

Approved March 24, 1903.

 CHAPTER 90.

An Act to amend an act entitled "An act to provide for the permanent improvement of public roads in this state," approved April first, one thousand nine hundred and three.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. Amend section ten of the act to which this is an amendment so that it shall read as follows:

10. The board of chosen freeholders may, instead of certifying to the county board of assessors the two-thirds cost of any work done under this act, as required by the ninth section of this act, by resolution, adopted by a vote of at least two-thirds of all its members, issue bonds of the county for two-thirds of the estimated cost of said work, which bonds shall be designated as "road improvement bonds," and shall be for such sums and in such amounts, payable in not less than six nor more than thirty years from date thereof, with interest at a rate not exceeding five per centum per annum, payable annually or semi-annually, as said board of freeholders, by said resolution, may determine; said bonds shall be signed by the director of the board of chosen freeholders and by the county collector, sealed with the seal of the board, properly numbered, and a registry thereof kept by the board, and may be either coupon or registered

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bonds, and, if coupon bonds, the coupons shall be signed by the director of the board, and shall be numbered to correspond to the several bonds to which they shall be severally attached; the board of freeholders shall, when bonds are issued under the provisions of this section, certify to the county board of assessors, in each and every year so long as any of said bonds remain outstanding, a sum sufficient to pay the interest accruing on said bonds for said year and the principal of any bond or bonds that shall mature in said year, and the said county board of assessors shall include the said sum in the annual tax levy or assessment for said year, and the same shall be collected and paid over in the same manner and at the same time as other county taxes.

Approved March 28, 1904.

 CHAPTER 114.

An Act to enable boards of chosen freeholders to accept as county roads, roads or sections of roads, in townships, which have been or shall hereafter be permanently improved without state or county aid.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. Whenever any public road or section of road, located in any township of this state, has been or shall hereafter be permanently improved, without state or county aid, by the construction thereon of a macadamized road, or telford or other stone road, so that the same is or shall be, with reasonable repairs thereto, firm, smooth and convenient for travel at all seasons of the year, and approved by the state commissioner of public roads, such public road or section of road may, upon the petition in writing of the township committee of the township wherein such public road or section of road so improved lies, addressed to and filed with the board of chosen freeholders of the county within which such town-

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ship is situate, accompanied by a map or survey of the public road or section of road so improved and a copy of the specifications under which such improvements were made, together with proofs showing full payment to the contractor or contractors for all work done, be, by said board of chosen freeholders, by resolution, accepted as and declared to be a county road if in the judgment of said board of freeholders said road is of sufficient public importance; and such public road or section of road shall, upon such acceptance, forever thereafter be a county road and subject to the exclusive jurisdiction of said board of chosen freeholders in the same manner as roads built by state aid, and the duty of keeping the same in repair shall devolve exclusively upon such board of chosen freeholders.

2. More than one public road or section of road in the same township may be included in one petition.

3. This act shall take effect immediately.

Approved March 28, 1904.

Following is the text of the State Aid Road Law of 1895, now almost entirely superseded by that of 1903:

CHAPTER CCXXIII.

An Act to provide for the permanent improvement of public roads of this State.

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That whenever the board of chosen freeholders of any county in this State shall, by resolution, have declared their intention to cause any particular road or section thereof, within such county, to be improved under the provisions of this act, such board shall cause all necessary surveys to be made and specifications to be prepared; the specifications shall require the construction of a macadamized road, or a

Board of freeholders may cause road to be improved.

What specifications required.

telford or other stone road, or a road constructed of gravel, oyster shells or other good materials, in such manner that the same, of whatever materials constructed, will, with reasonable repairs thereto, at all seasons of the year, be firm, smooth and convenient for travel; shall be so prepared as to call for bids from which an approximate estimate of the cost can be ascertained, and shall state the amount of security that will be required of the bidder; after said specifications shall have been prepared they shall be submitted to the board of chosen freeholders for their approval or rejection; and if such board shall approve them, they shall then be submitted to the state commissioner of public roads for his approval or rejection; it shall be the duty of the commissioner of public roads, before approving the specification of any road so submitted to him, to ascertain by personal examination or otherwise, the natural character of the soil upon which such road is proposed to be constructed, and all other facts that he may deem important, and if, after examination of the specifications and facts so ascertained, he shall be of the opinion that the specifications provide for the construction of a road that will, with reasonable repairs thereto, be firm, smooth and convenient for travel at all seasons of the year, and if he shall also be of the opinion that one-third of the cost of constructing the road or section of road to which such specifications relate, together with one-third of the cost of constructing all other roads and sections of roads in this state under specifications previously approved by him, will not in any one year exceed the sum of one hundred thousand dollars, then he shall approve the specifications, but otherwise he shall reject them; *provided, however,* that he shall, in his discretion, have the power to withhold his approval of any specifications, to the end that the estimated aggregate amount of contracts made in any one year shall not exceed the sum of three hundred thousand dollars, and also to the end that the amounts paid out of the state treasury under the provisions of this act shall in each year be distributed amongst the several

How prepared.

Freeholders to reject or approve.

Commissioner to examine road and approve specifications.

Cost of all roads not to exceed 83½ per cent.

May withhold his approval.

Distribute among the counties.

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counties of the state in such manner as to the said state commissioner of public roads shall seem fair and equitable, and any specifications, the approval of which is withheld as aforesaid, may, if otherwise satisfactory to the said state commissioner of public roads, be approved by him in any year subsequent to the one in which the same may be presented for approval as aforesaid; if the board of chosen freeholders and the state commissioner of public roads shall both approve such specifications, it shall then be the duty of the director of the board of chosen freeholders to advertise in at least two daily newspapers, printed and circulating in the county, for the period of two weeks, or in at least two weekly newspapers, printed and circulating therein, for at least four weeks; for bids to do the work according to the specifications prepared; such advertisements shall state where bidders may find the specifications, and shall name a time and place where the board of chosen freeholders, or a committee of five members thereof, of whom the director shall be one, will meet to receive bids; every such bid shall be accompanied with the bidder's bond in the sum of one thousand dollars, with security satisfactory to the board, conditioned that if the contract shall be awarded to him he will, when required by the board, execute an agreement in writing to perform the work according to the specifications; no bids shall be received by the board or any member thereof, or by said committee or any member thereof, except at a meeting of said board or committee, of which notice shall be given as aforesaid, and all bids then received shall be immediately publicly read; if the bids shall be received by a committee of the board they shall be reported to the board at the next meeting thereof, with the recommendations of the committee; the board may reject all bids if, in their opinion, good cause exists therefor, but otherwise they shall award the contract to the lowest bidder who shall give satisfactory evidence of his ability to perform the contract; *provided, however,* that the estimated amount of contracts awarded in any one year by any board of

When approved, freeholders must advertise for bids.

Committee to receive bids.

Bidders must give bond.

Bids, how received.

Limit of county expenditures.

chosen freeholders, together with the estimated cost of repairs of roads already constructed, shall not exceed one-fourth of one per centum of the ratables of the county as reported to the state comptroller for the last preceding year; *and provided further*, that in every contract made as aforesaid it shall be specified that at least five per centum of the contract price shall not be paid to the contractor within the period of one year after the work specified to be done by such contract shall have been fully performed and accepted; the bidder to whom the contract may be awarded shall, in addition to executing the agreement to perform the work according to the specifications, also execute to the board of chosen freeholders a bond conditioned for the faithful performance of the contract, in the sum specified in the advertisement for bids, and with such sureties as the board may approve; the contract shall, on behalf of the board of chosen freeholders, be executed by the director thereof, and, when executed by the bidder and said director, a copy of the contract and specifications, with the estimated cost of the work, shall be forthwith filed with the state commissioner of public roads.

Five per centum to be retained by county.

Contractors must give bond.

Copy of contract and specifications filed with state commissioner.

Commissioner must appoint supervisor.

2. *And be it enacted*, That after a copy of the contracts and specifications shall have been filed with the state commissioner of public roads as aforesaid, the said state commissioner of public roads shall, as soon as practicable, appoint a supervisor of the construction of the work under such contract, who shall receive for his services under this act three dollars per day, to be paid out of the county treasury; if the work for which such contract shall be made shall have been petitioned for, pursuant to the provisions of the eighth section of this act, then, if the petitioners therefor, or any of them, shall in writing nominate to the said state commissioner of public roads one or more persons for the position of such supervisor, it shall be the duty of said state commissioner of public roads, if only one nomination be made, to appoint as such supervisor the person so nominated, and, if more than one nomination be made, to

Property-owners nominate supervisor.

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appoint as such supervisor one of the persons so nominated, and if no such nomination be made, the said state commissioner of public roads shall then appoint as such supervisor any person whom he may consider competent for such position; the said state commissioner may, however, at any time summarily discharge any supervisor who, in the judgment of the state commissioner, is incompetent or who neglects his duty, and, in such case, shall appoint a new supervisor to take the place of the one so discharged; the supervisor shall supervise all work done under the contract, shall give his whole time thereto, shall require the provisions of the contract to be strictly adhered to by the contractor, and in any case where the contract provides for partial payments during the progress of the work, he shall also, as each payment becomes due, and before payment shall be made, present to the board his certificate, and also the certificate of the surveyor or engineer, if any there be, stating as near as may be the total amount of work done, and that such work has been done in all respects as required by the contract; and the board shall thereupon direct payment to be made by the county collector; *provided*, that no partial payment made during the progress of the work shall exceed eighty per centum of the estimated value of the work done; the board shall have power to borrow on temporary loans on the credit of the county such sums of money for the purpose of carrying on such work as may from time to time become necessary; and when the work shall have been fully completed, and the terms and conditions of the contract shall have been fully complied with, and such facts shall have been certified to the board to their satisfaction by the supervisor and the surveyor or engineer, if any there be, payment in full shall be made, less the amount required to be withheld for the period of at least one year, as in the next preceding section specified.

3. *And be it enacted*, That when the work under any contract shall have been fully completed, it shall be the duty of the supervisor to prepare a detailed and

Commissioner
may remove
supervisor.

Supervisor
must give his
full time to the
work.

Supervisor
must certify
payments.

Freeholders
may borrow
money tempo-
rarily.

Supervisor to
prepare final
certificate.

itemized statement in duplicate of the cost of the improvement, one copy whereof shall be filed with the board of chosen freeholders, and one with the state commissioner of public roads.

State to pay one-third cost.

Total state appropriation.

4. *And be it enacted.* That one-third of the cost of all roads constructed in this state under this act shall be paid for out of the state treasury; *provided*, that the amount so paid shall not in any one year exceed the sum of one hundred thousand dollars; if one-third of such cost shall appear by the statements filed in any one year with the state commissioner of public roads to exceed the said sum of one hundred thousand dollars, then, and in such event, the said sum of one hundred thousand dollars shall be apportioned by the governor and state commissioner of public roads amongst the counties of the state in proportion to the cost of roads constructed therein for such year, as shown by the statements of costs filed in the office of the state commissioner of public roads; the governor and said state commissioner of public roads shall, between December fifteenth and thirty-first in each year, certify to the state comptroller the amount to be paid to each county for such year, and the state comptroller shall thereupon draw his warrants in favor of the respective county collectors for the sums certified as aforesaid upon the state treasurer, who shall pay the same out of any moneys in the state treasury not otherwise appropriated.

Allotment to be made before December 31st.

Comptroller to draw warrants.

Board of freeholders to certify cost to assessors.

5. *And be it enacted.* That on or before September first in each and every year it shall be the duty of the board of chosen freeholders to certify to the county board of assessors, either in the annual tax budget or separately, two-thirds of the estimated cost of all work for which contracts shall have been awarded under this act during such year; and the county board of assessors shall include the sum so certified in the county taxes assessed for such year, and the same shall be assessed, collected and paid over to the county in the same manner and within the same time that other county taxes are assessed, collected and paid over; if a deficiency shall exist in consequence of the cost exceeding the esti-

Deficiency, how met.

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mate, or in consequence of the receipt of less than one-third of the cost from the state treasury, the board of chosen freeholders shall have authority to borrow on temporary loans to the amount of such deficiency until the next annual taxes shall be assessed, collected and paid over to the county; and if there be a surplus, in consequence of the cost being less than the estimate, such surplus shall be retained and used in the construction of other roads under this act, or in repairs to roads constructed under this act.

6. *And be it enacted*, That instead of certifying to the county board of assessors two-thirds of the estimated cost of all work for which contracts shall have been awarded under this act in any one year, as required by the fifth section of this act, or two-thirds of said estimated cost, less one-tenth of said estimated cost, as required by the eighth section of this act, the said board of chosen freeholders may, if a resolution to such effect shall be adopted by a vote of at least two-thirds of all its members, borrow such sum or sums of money as may be necessary for the payment of such proportion of said estimated cost by the sale of the bonds of such county, issued in the name of the board of chosen freeholders thereof, and in such sums as the said board may deem proper; said bonds shall bear interest at a rate not exceeding five per centum per annum, shall be sold at not less than their par value, shall not exceed in the aggregate the proportion of the estimated cost of such roads as hereinabove mentioned, shall be so divided that one-tenth of the amount of the proportion of said estimated cost shall fall due in one year from their date, and one-tenth of the proportion of said estimated cost in each successive year thereafter for the period of ten years after their date, and shall be either coupon or registered bonds, as the board of chosen freeholders may determine; the principal and interest thereof may be made payable at the office of the county collector of such county; said bonds shall be signed by the director of said board and the county collector, and shall be sealed with the seal of the county,

Two-thirds less
one-tenth.

Bonds, how
sold.

When to ma-
ture.

Record to be kept.

and the county collector shall keep a record thereof; it shall be the duty of the board of chosen freeholders each year to place in the tax levy for such county in each year, so long as said bonds shall run, a sufficient sum to pay the interest accruing thereon for said year and the principal of the bonds that shall mature in said year.

County road, township rights acquired.

7. *And be it enacted,* That any road constructed under the provisions of this act, except within the limits of any city, shall forever thereafter be a county road, and the duty of keeping the same in repair, except within the limits of any city, shall devolve upon the board of chosen freeholders and the county supervisor hereinafter mentioned, and all other powers and duties respecting such roads, except within the limits of any city, shall be imposed upon and vested in the said board of chosen freeholders, to the exclusion of all township, borough or other municipal officers excepting city officers; after the first road shall have been constructed under this act in any county, it shall be the duty of the board of chosen freeholders thereof to appoint a county supervisor of roads, who shall hold his office for three years and until his successor is appointed, shall give bond to the board of chosen freeholders in the sum of one thousand dollars conditioned for the faithful performance of the duties of his office, with such sureties as the board may approve, and shall receive such salary or allowance as the board may fix; the board of chosen freeholders shall provide all moneys necessary to keep in a proper state of repair the roads constructed under this act, except within the limits of any city, and may, if there be no moneys on hand that can be lawfully used for such repairs, borrow therefor on temporary loans until the next annual taxes shall have been assessed, collected and paid over to the county; it shall be the duty of the supervisor to report to the board of chosen freeholders, or to the road committee thereof, all repairs he may think necessary or proper to be made to such county roads, and under the direction and control of the said board of freeholders, or its road committee, to

County supervisor when appointed.

Compensation to be fixed. Duties of.

County to borrow by temporary loans.

Money, how expended.

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expend moneys raised for such repairs in such manner and upon such portions of the roads as will tend to keep them in the best possible state of repair; no part of said moneys shall be paid into the hands of the supervisor, but all expenses of repairs shall be paid by the county collector on the orders of the board of chosen freeholders, granted only on the presentation of bills verified by affidavit, as now required by law in the case of other claims against the county; if the board of chosen freeholders shall neglect or refuse to make appropriations sufficient to keep any such road as aforesaid in good repair, any citizen of the county may apply to the supreme court for a writ of mandamus to compel said board to make an appropriation as aforesaid; and when any such application is made, the court, upon a rule to show cause or otherwise, in such manner as the court shall prescribe, shall ascertain and determine whether such road as aforesaid is in a proper state of repair and may also, in its discretion, allow to the attorney of the applicant a reasonable counsel fee to be paid by the county; in case the board of chosen freeholders shall not have on hand sufficient moneys out of which to make the appropriation commanded to be made by any writ of mandamus granted as aforesaid, they shall borrow such sum or sums as may be necessary therefor on temporary loans on the credit of the county, and shall require the amount so borrowed to be raised by taxation with the next assessment of county taxes; it shall be the duty of the authorities of any city within which any portion of road may be constructed under the provisions of this act to keep the portion thereof within such city in repair forever after such construction, and such city shall have the same power, authority and jurisdiction over such portion of such road, and shall have imposed upon it the same duties as were imposed upon and vested in it with respect to such portion of such road before its improvement under the provisions of this act.

County collector to make all payments.

Neglect to repair.

Freeholders to be mandated.

Portion of road within city limits to be kept in repair by the city.

8. *And be it enacted*, That whenever there shall be presented to the board of chosen freeholders of any

Petition, how signed.

county a petition signed by the owners of at least two-thirds, either in lineal feet or area, of the lands and real estate fronting or bordering on any public road or section of road in such county, taking in said estimate of area all the lands of every such owner which are assessed for taxes in said county and which lie together in any farm, tract or lot of which a part has a frontage on said road or section of road, praying the board to cause such road or section to be improved under this act, and setting forth that they are willing that the peculiar benefits conferred on the lands fronting or bordering on said road or section shall be assessed thereon in proportion to the benefits conferred to an amount not exceeding ten per centum of the entire cost of the improvement, it shall be the duty of the board to cause such improvement to be made; *provided*, that the road or section desired to be so improved shall be at least one mile in length, or, if it be less than one mile in length, shall be an extension of or connection with some other permanently improved or paved road or street; *and provided further*, that the estimated cost of all improvements made under this act, together with the estimated cost of repairs of roads already constructed in any county in any one year shall not exceed one-fourth of one per centum of the ratables of such county for the last preceding year; *and provided further*, that where more roads are applied for than can be constructed under this act in any one year, the said boards of chosen freeholders shall have the power and authority to select from the roads petitioned for the ones first to be constructed, having regard to the most important roads and the distribution of the benefits of this act to all parts of their counties; it shall not be necessary for the board in any such case to declare by resolution their intention to cause such improvement to be made, but they shall forthwith cause all necessary surveys of such road or section to be made, and specifications to be prepared for a macadamized road, or a telford or other stone road, or a road constructed of gravel, oyster shells or other good material, in such

Lineal feet or area.

Length of road.

If less than one mile.

Estimated cost not to exceed one-fourth of one per centum of ratables.

Board of freeholders to select road under certain circumstances.

Must cause surveys to be made and specifications prepared.

Stone or other good material to be used.

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manner that the same, of whatever materials constructed, will, with reasonable repairs thereto, at all seasons of the year, be firm, smooth and convenient for travel; the proceedings shall thereafter be the same as is hereinbefore required in cases where such intention has been declared; if the specifications shall not be approved by the board or by the state commissioner of public roads, or if all the bids for the work shall be rejected, it shall be the duty of the board to cause other specifications to be prepared, or re-advertisements for bids to be made, as often as may be necessary and until a contract shall be awarded, to the end that the improvement prayed for may be completed with reasonable speed; *provided, however,* that no re-advertisement need be made where the lowest bid submitted shows that the improvement prayed for cannot be made within the limit of expenditure in this section above mentioned; in every case where a contract shall be awarded after the presentation of such petition as aforesaid, the board of chosen freeholders, instead of certifying to the county board of assessors two-thirds of the estimated cost of the work, as prescribed by the fifth section of this act, shall, unless they determine to issue bonds in the manner prescribed by the sixth section of this act, which they are hereby authorized to do, certify two-thirds of said estimated cost, less one-tenth of said estimated cost, which sum the county board of assessors shall include in their assessments of county taxes.

9. *And be it enacted,* That when the improvement prayed for as aforesaid shall have been completed and the statement of the cost thereof filed with the board of chosen freeholders, as prescribed by the third section of this act, said board shall apply to the circuit court of the county for the appointment of commissioners to estimate and assess the peculiar benefits conferred by such improvement upon the lands and real estate fronting or bordering on the road or section thereof improved, of the time and place, of which application notice shall be given by ten days' publication in two daily newspapers printed and circulating in the

When specifications are not approved or bids rejected.

Other specifications to be made.

No re-advertisement necessary.

After contract awarded, board to certify two-thirds estimated cost, less one-tenth to assessors.

Commissioners to estimate benefits how appointed.

To give notice of appointment of.

county, or by two weeks' publication in two weekly newspapers printed and circulating therein, at which time and place, or at such other time and place as the court shall designate, said court shall, without unnecessary delay, appoint three commissioners, who shall be disinterested freeholders and residents of the county in which the application is made, to estimate and assess the benefits aforesaid; the said court shall have power to remove any commissioner and appoint another in his place and also fill any vacancy that may occur in the office of any commissioner from any cause; said commissioners shall each receive three dollars per day, to be paid by the county collector.

Court to appoint and remove commissioners.

Compensation of.

Oath of commissioners.

10. *And be it enacted*, That said commissioners, before entering upon the duties required of them by this act, shall take and prescribe before some person duly authorized to administer the same an oath or affirmation that they will make all assessments and estimates required of them fairly, legally and equitably, according to the best of their skill and understanding, which oath or affirmation shall be attached to the report that they are hereinafter required to make.

Commissioners to give public hearing of time of meeting.

11. *And be it enacted*, That the said commissioners, having thus qualified, shall give such notice as the court may direct of the time and place when and where they will hear any persons in interest who may present themselves to be heard, and at such time and place and at such other times and places to which they may adjourn for that purpose the said commissioners shall attend, and shall give a public hearing to those persons in interest who may desire to be heard; the said commissioners shall have power to examine witnesses under oath or affirmation, to be administered by any one of them, and to enter upon and view the lands and real estate fronting or bordering on the road or section thereof improved, and to adjourn from time to time in their discretion, or as directed by said court; they shall use diligent efforts to ascertain the names of the owners of the lands fronting or bordering on the road or section thereof improved, and shall state the same in the

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report hereinafter mentioned; but the failure to ascertain the name of any owner, or to state the same correctly, or the omission of any such name from the report, shall not invalidate said assessment nor be a bar to the collection of the same.

12. *And be it enacted*, That after having given opportunity as aforesaid for a public hearing of the persons in interest, and having viewed the lands fronting or bordering on the road or section thereof improved as aforesaid, the said commissioners shall make a report in writing of their estimates and assessments to the said court, accompanied by a map prepared by the engineer in charge of the construction of the road, showing the several tracts or parcels of land and real estate fronting or bordering on said road or section thereof; the said report shall state the cost of the whole work, which shall be furnished to the commissioners by the board of chosen freeholders from the report of the supervisor of construction filed with said board under the requirement of the third section of this act, and shall give the names, so far as ascertained, of the owners of the tracts or parcels of land and real estate fronting or bordering on said road or section thereof, the city, township, borough or other municipality in which each tract or parcel of lands is situate, and the amount of the assessments upon the owner or owners of each of said tracts or parcels of lands and real estate for the said benefits; which several assessments shall be in proportion, as near as may be, to the peculiar benefits deemed to have been conferred by said improvement upon the respective tracts of lands and real estate aforesaid; if any tract of land shall be located in more than one city, township, borough or other municipality, it shall be stated in said report as being in the city, township, borough or other municipality, in which there is the greatest frontage by lineal feet on the road or section thereof improved; in no case shall any tract or parcel of land and real estate, or any owner thereof, be assessed beyond the amount of benefit actually derived from said improvement, nor shall the aggregate amount of assessments imposed upon the

Commissioners
to report in
writing.

Map made by
engineer in
charge of the
road.

Names of prop-
erty-owners
required.

Location of
tracts of land.

tracts or parcels of land fronting or bordering on such road or section thereof exceed ten per centum of the total cost of the improvement.

Court to give notice of hearing.

13. *And be it enacted.* That upon the coming in of any such report signed by the said commissioners, or any two of them, said court shall cause such notice to be given as it shall deem proper, of the time and place of hearing any objections that may be made to such assessment, and after hearing any matter that may be alleged against the same the said court, either by rule or order, shall confirm the said report, or shall refer the same to the same commissioners for revision and correction, or to new commissioners to be appointed by the said court forthwith to reconsider the subject-matter thereof, and the said commissioners to whom such report shall be so referred by the court shall return the same corrected and revised, or a new report to be made by them in the premises, to the said court, without unnecessary delay, and the same, being so returned, shall be confirmed, or again referred by the said court in the manner aforesaid, as right and justice shall require, and so, from time to time, until a report shall be made or returned in the premises which said court shall confirm; such report, when so confirmed, shall be final and conclusive, as well upon the said boards of chosen freeholders and the cities, townships, boroughs or other municipalities in which said lands may be situate, as upon the owners of any lands and real estate affected thereby, and the court shall require the same to be forthwith filed with the county clerk, and certified copies thereof and of the accompanying map, and of the rule or order confirming the report, to be promptly delivered to the county collector, one for said county collector and for each city, township, borough or other municipality in which the assessed lands may lie; the county collector shall retain one of the said copies for his own use, and shall forthwith give one to the collector or receiver of taxes in each of the cities, townships, boroughs and other municipalities in which the as-

Court may order new report.

When report is confirmed shall be final and conclusive.

File with county clerk. Copies to county collector and townships, &c.

sessed lands may lie; each city, township, borough or other municipality whose collector or receiver of taxes shall receive such certified copy shall, by its proper disbursing officer, within six months after the date of the said order of confirmation, pay the amount of assessments appearing by said report to have been assessed upon the lands situate in such city, township, borough or other municipality, who shall receive for his services three per centum of the money so collected to be paid by the county.

Township to collect in six months.

14. *And be it enacted*, That no certiorari shall be allowed by any court to review any of the proceedings in relation to such improvement, nor in any way to affect any assessment made by such commissioners, after the lapse of thirty days from the making of the order of the court confirming such assessment; the court shall designate what notice, if any, shall be given by the publication or otherwise of the confirmation of the report of said commissioners.

No certiorari allowed.

15. *And be it enacted*, That the assessments made by said commissioners shall be and remain a lien upon the lands assessed from the date of the confirmation of the report of assessments in the same manner and to the same extent that taxes are liens upon lots or tracts of land situate in the city, township, borough or other municipality in which the assessed lands may be.

Assessments to remain a lien on the property.

16. *And be it enacted*, That the receiver or collector of said city, township, borough or other municipality shall, as soon as the said report is delivered to him, give to the owners of lots and tracts of lands appearing by said report to be assessed, such notice of the assessments and of the time within which the same are required to be paid, as the court in its order of confirmation, hereinabove mentioned, shall prescribe; all such assessments shall become due and payable to such receiver or collector within six months from the date of the order of confirmation hereinabove mentioned.

Collector to notify owners of lands.

17. *And be it enacted*, That if any assessment upon any lot or tract of land made under the provisions of this act shall not be paid within the time appointed in

Townships, &c., to bring suits for collection of assessments.

said notice, the township committee, common council or other governing body of the city, township, borough or other municipality within which such lot or tract of land shall be situate, or a majority of them, may, as they shall deem proper, either bring an action on contract in any court of competent jurisdiction, in the corporate name of such city, township, borough or other municipality, against the owner or owners of such lot or tract of land for so much money laid out and expended by them for the use of such owner or owners and declare generally, and give the special matter in evidence, and either party from any judgment rendered therein may have the same remedy by appeal or otherwise as if said parties were private individuals, or they may proceed to collect the said assessment by sale of the lot or tract of land whereon such assessment has been imposed, or may be a lien, in the same manner and to the same extent as lands are now sold for unpaid taxes in such city, township, borough or other municipality, and the purchaser or purchasers at any such sale or sales, and his legal representatives shall hold and enjoy such lot or tract of land, with the rents, issues and profits thereof, in the same manner and by the same title and tenure as purchasers at the sales of lots or tracts of land for unpaid taxes can now hold and enjoy the same in such city, township, borough or other municipality.

Either party may appeal.

Assessments to be a lien upon the lands and sold as lands are now sold for taxes.

Property-owners may improve at their own expense.

18. *And be it enacted*, That if any property owners or owner along any road in any county of this state which has not been improved, or is not undergoing improvement, under the previous sections of this act, shall desire any section of any road in such county to be improved, and are or is willing to contribute the whole expense of such improvement, the supervisor of roads of such county shall, upon the written request of such owners or owner, make a plan of such section of road so to be improved, in which shall be given the levels and distances, and also specifications, which shall state the materials that may be used, and the manner of using them; and a copy of such plan, specifications and of any bids to do such work shall then be sub-

Bids and specifications received.

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mitted by such owners or owner to the board of chosen freeholders, and if such board shall approve them, it shall then be lawful for such owners or owner to accept any bid or bids so approved from among the bidders, and proceed to build such section of road according to such plan and specifications, and such owners or owner shall have control of the expenditure of the moneys used to make such improvement, subject to the approval and supervision of the supervisor of such county; and upon the completion of the improvement to the satisfaction of the said supervisor and said board of chosen freeholders, and upon the submission to said board of receipts, showing full payment for materials furnished and work done under the plan and specifications, such section of road so improved shall thereafter be a county road; and the said supervisor shall be paid by the aforesaid owners or owner the sum of ten dollars for making the plan, the sum of five dollars for drawing the specifications, and the sum of five dollars for the supervision of the work, and in case such supervisor is not a civil engineer and an actual survey is necessary, then such owners or owner, at their or his expense, shall procure a survey, which shall be subject to the approval of such supervisor, which survey shall take the place of the plan before mentioned.

Owners to dis-
burse the
money.

Shall be a
county road.
Fees allowed.

19. *And be it enacted*, That the act entitled, "An act to provide for the more permanent improvement of the public roads of this state," approved the fourteenth day of April, one thousand eight hundred and ninety-one, and all acts supplementary thereto and amendatory thereof, be and the same are hereby repealed; *provided, however*, that this section shall not cause any proceedings for the improvement of any public road or section thereof under the provisions of the act hereby repealed to abate, but such proceedings may be continued under the provisions of this act in the same manner as if they had been commenced hereunder.

General re-
pealer.

Proviso.

20. *And be it enacted*, That this act shall take effect immediately.

Approved March 22, 1895.

CHAPTER 6.

ACT TO INCREASE APPROPRIATIONS.

A Further Supplement to "An act to provide for the permanent improvement of public roads in this state," approved March twenty-second, one thousand eight hundred and ninety-five.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Appropriation for roads.

1. The sum of two hundred and fifty thousand dollars be and the same is hereby appropriated annually, or so much thereof as may be included in the annual appropriation law, to be paid out of any moneys in the state treasury not otherwise appropriated, for the extension of the benefits and making effective the provisions of the act to which this act is a supplement.

Repealer.

2. All acts or parts of acts inconsistent herewith be and the same are hereby repealed, and this act shall take effect immediately.

Approved March 5, 1902.

CHAPTER 44.

STATE AID TO TOWNSHIPS.

Supplement to an act entitled "An act to provide for the permanent improvement of public roads in this State," approved March twenty-second, one thousand eight hundred and ninety-five.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

When property may be assessed not to exceed 10 per cent. for road benefits.

1. Whenever there shall be presented to the township committee, borough council, board of trustees or commissioners, or other governing body of any township,

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town, borough, village or municipality governed by a board of commissioners, a petition signed by the owners of at least two-thirds in lineal feet of the lands fronting on any public road or section of road in such township, town, borough, village or municipality, praying such governing body to cause such roads or section to be improved under the act to which this is a supplement, and setting forth that they are willing that the peculiar benefits conferred on the lands fronting on said roads or section shall be assessed thereon, in proportion to the benefits conferred, to an amount not exceeding ten per centum of the entire cost of the improvement, it shall be the duty of such governing body to consider and determine whether the road or section mentioned in such petition is of sufficient general importance to warrant the expenditure necessary for the improvement thereof, and to grant the prayer of such petition or refuse the same if of opinion that the improvement is not of sufficient public importance, or that the expense thereof will be an unnecessary public burden; and in case the prayer of such petition is granted, then such road shall be improved in the same manner and subject to the same regulations, as far as practicable, as in case where a petition is presented to the board of freeholders of any county under the eighth section of the act to which this is a supplement.

2. The said governing body shall cause all necessary surveys to be made, and specifications to be prepared for a macadamized road, or a telford or other stone road, or a road constructed of gravel, oyster shells or other good material, in such manner that the same will, with reasonable repairs thereto, at all seasons of the year, be firm, smooth and convenient for travel, and shall thereafter proceed in the same manner as the board of freeholders is required to proceed by the act to which this is a supplement; and the state commissioner of public roads shall have the same power and authority in respect to the roads authorized by this supplement as by said act are conferred upon him in respect to roads improved under such act.

Construction of
road; super-
vision.

Supervisor of
construction.

3. The state commissioner of public roads shall appoint as supervisor of the work, such person as shall be nominated by such governing body; such supervisor shall perform the same duties and shall be subject to the same provisions as the supervisor appointed under the act to which this is a supplement, and shall be paid out of the treasury of the township, or other municipality, and shall file one copy of the statement required by the third section of the aforesaid act with the township committee or other municipal authority, and the other with the state commissioner of public roads.

Proportion of
charges, how
assumed.

4. The aggregate amount of the peculiar benefits conferred on the lands fronting on any road improved under authority of this supplement, not exceeding ten per centum of the entire cost of the improvement, shall be borne by the owners of the land so benefited, one-third of the cost of the improvement (less so much thereof not exceeding one-tenth as shall be assessed upon the property benefited) shall be paid for out of the state treasury; the remaining two-thirds of such cost shall be borne by the said township, or other municipality within which said road is located.

Assessment of
benefits.

5. The amount of peculiar benefits conferred by such improvement on lands fronting on such road shall be assessed on the application of the township committee, or other governing body, in the manner prescribed by the act to which this is a supplement, and all proceedings under this supplement shall conform as far as practicable to the proceedings authorized and directed by said act, and the said governing body shall, so far as concerns roads constructed by virtue of this supplement, perform the same duties and have the same powers as by said act devolve upon the board of freeholders in respect to roads built under the aforesaid act.

Maintenance
of roads.

6. Every road constructed under the provisions of this supplement shall thereafter be maintained and kept in repair by the township or other municipality in which such road is situate, in the same manner in all respects as other public roads therein are or may be maintained

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and kept in repair, and none of the special provisions of the act to which this is a supplement, whereby said road shall be a county charge, shall be applicable to roads built by authority of this supplement.

7. This act shall take effect immediately.

Approved March 17, 1899.

CHANGING LOCATION OR IMPROVING.

CHAPTER 75.

An Act to amend an act entitled "An act to provide for the permanent improvement of public roads in this state," approved March twenty-second, one thousand eight hundred and ninety-five.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. The eighteenth section of the said act shall be amended so as to read as follows:

18. That if any property owners or owner along any road in any county of this state which has not been improved or is not undergoing improvement under the previous sections of this act shall desire any section of any road in such county to be improved or to be changed in location and improved, and are or is willing to contribute the whole expense of such improvement, and provided every owner of land upon that part of the road proposed to be vacated under this act shall consent in writing to such vacation, the supervisor of roads of such county shall, upon a written request of such owners or owner, make a plan of such sections of roads so to be improved or changed in location and improved, in which shall be given the levels and distances, and also specifications stating the materials that may be used and the manner of using them; and a copy of such plan, location, change of location, specifications and of any bids to do such work shall then be sub-

Property-owners to contribute whole expense of improvement.

Owner to have
control of ex-
penditures.

mitted by such owners or owner to the board of chosen freeholders, and if such board shall approve them and any change of location which may be proposed, it shall then be lawful for such owners or owner to accept any bid or bids so approved from among the bidders, or at their own expense to proceed to build such section of road according to such plan, location and specifications, and such owners or owner shall have control of the expenditure of moneys used to make such improvements, subject to the approval and supervision of the supervisor of such county; and, upon the completion of the improvement to the satisfaction of the said supervisor and said board of chosen freeholders, and upon the submission to said board of receipts showing full payment for materials furnished and work done under the plan and specifications, such section of road so improved shall, if the board of chosen freeholders shall so declare, thereafter be a county road, but otherwise shall remain an ordinary public highway, and any and all portions of any road now existing which may have been rendered unnecessary or be superseded by the new road so constructed shall be vacated and abandoned as a public road, without other action or proceedings than the approval of the board of chosen freeholders as hereinbefore provided; and the said supervisor shall be paid by the aforesaid owners or owner the sum of ten dollars for making the plan, the sum of five dollars for drawing the specifications, and the sum of five dollars for the supervision of the work, and in case such supervisor is not a civil engineer and actual survey is necessary, then such owners or owner, at their or his expense, shall procure a survey, which shall be subject to the approval of such supervisor, which survey shall take the place of the plan before mentioned, and shall include all the new roads proposed to be constructed and all the old roads proposed to be abandoned.

Old road
vacated.

Approved March 23, 1896.

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INCREASED POWER TO BORROW.

An Amendment to an act entitled "A supplement to an act entitled 'An act to enable boards of chosen freeholders to acquire, improve and maintain public roads,'" approved March nineteenth, one thousand eight hundred and eighty-nine, which supplement was approved April ninth, one thousand eight hundred and ninety-two.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. The first section of an act entitled "A supplement to an act entitled 'An act to enable boards of chosen freeholders to acquire, improve and maintain public roads,'" approved March nineteenth, one thousand eight hundred and eighty-nine, which supplement was approved April ninth, one thousand eight hundred and ninety-two, be amended so as to read as follows:

Section be amended.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. In counties of the second class it shall be lawful to raise a sum not to exceed four hundred thousand dollars, for which bonds may be issued by the board of chosen freeholders of any such county, under the act to which this is a supplement or any supplement or amendment thereof; *provided, however,* that if work under said act and supplements or amendments has already been done to an amount exceeding said sum, bonds under said act and supplements may be issued to an amount sufficient to raise and pay for such work; *and provided also,* that no county road bond shall be issued to such an amount as, in addition to existing debt, shall raise the debt of the county for all purposes above three per centum of the assessed value of the real estate therein; and in case any such bonds shall be issued in excess of the limit aforesaid, all such bonds so issued in excess shall be void in the hands of any

Amount authorized to raise and bonds issued.

Proviso.

Proviso.

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person or party, notwithstanding any recitals therein or any representations that may be made concerning the same; in case application has already been made to the circuit court and a certificate shall have been recorded and filed, as required by said act, such application need not be repeated in case of any subsequent issue of such bonds where the original certificate on file shows that the new issue of bonds will not exceed three per centum of the assessed value of the real estate in said county as limited by this act.

2. The second section of said act be amended, so as to read as follows:

2. In any county of the second class wherein the board of chosen freeholders thereof shall heretofore or may hereafter issue bonds under said act and supplements, that such board of such county shall not use any of the money so raised for any other purpose except to grade, macadamize or improve any road in any such county, under the provisions of the act to which this is a supplement and the several supplements and amendments thereof; *provided*, nothing herein shall prohibit the doing of the necessary repair of any road heretofore graded, macadamized or improved by any such board or that may be hereafter graded, macadamized or improved under said act and supplements.

3. All acts and parts of acts inconsistent herewith be and the same are, so far only as they conflict herewith, repealed, and that this act shall take effect immediately.

Approved March 24, 1897.

Board not to
use money
raised except
to grade, &c.

Proviso.

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CHAPTER 93.

POWER OF FREEHOLDERS TO BORROW.

A Supplement to an act entitled "An act in relation to county expenditures," approved April second, one thousand eight hundred and seventy-eight.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. In case of the injury or destruction by freshets or otherwise of any of the roads or sections of roads in this state that have become county roads under and by virtue of any law of this state whereby it shall be deemed necessary for the board of chosen freeholders, within the limits of whose county such roads or sections of roads so injured or destroyed may lie, to repair or rebuild the same, the said board of chosen freeholders may order and cause such roads or sections of roads to be repaired or rebuilt, notwithstanding the expense of repairing or rebuilding the same shall exceed the limit of the appropriations made for that year; and such board of chosen freeholders may borrow money on temporary loans for that purpose in anticipation of the next tax levy; and in the said tax levy there shall be incorporated a special appropriation under the head of "debts and interest, special deficiency," to pay for such temporary loans.

Repair of roads
damaged by
freshets.

Special charge.

2. This act shall take effect immediately.

Approved April 2, 1902.

CHAPTER 100.

A Supplement to an act entitled "An act to provide for the permanent improvement of public roads in this state," approved March twenty-second, one thousand eight hundred and ninety-five.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Boundary road or street may be improved.

1. Any road or street, or section of road or street, which constitutes the boundary line between two counties, may be acquired, improved and maintained in manner provided for in the act to which this act is a supplement.

Freeholders of adjoining counties may meet to consider improvements.

2. It shall be lawful for the board of chosen freeholders representing adjoining counties which are divided by any road, street or section of road or street, to jointly meet at such time and such place, in either county, as they agree upon, to consider and determine the question of acquiring, improving and maintaining said boundary road or street or section of road or street, according to the provisions of said act, to the best advantage of the public and the owners of property adjacent thereto; and to that end the said joint board are hereby authorized to prepare maps, plans and specifications, subject to the approval of the commissioner of public roads, for said improvement, which they shall deem necessary and proper for said purposes; the said joint board shall have power to employ a competent engineer or surveyor and such other assistance as they may deem necessary, and upon the completion of said maps, plans and specifications, duplicate copies thereof shall be filed in the office of the clerk of each of the counties affected thereby, and in the office of the commissioner of public roads.

Prepare maps.

Employ engineer.

Make contract.

3. The said joint board may adopt a resolution directing the improvement, as provided for in said act, to be made, and thereupon said joint board shall have

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full power and authority to enter into contracts with responsible persons for doing the work and furnishing the necessary materials therefor; they shall advertise for proposals in at least two newspapers published in each county, for at least three weeks, and their contracts shall be awarded to and made with the lowest responsible bidder who will comply with the requirements of the joint board and will give ample security for doing the work and performing the contract, but said joint board shall be under no obligation to accept the lowest bid, in which case all other bids will be thrown out and new proposals advertised for in the manner hereinbefore provided.

4. The said joint board shall, on the certificate of the engineer and surveyor, and on such other evidence as they may require as to the work done and materials used and furnished for said improvement, order payments to be made to the contractor or contractors in the manner provided in said act. **Payment.**

5. All costs and expenses incurred in the proceedings hereinbefore authorized shall be borne and paid by each county in equal proportion, and the said joint board shall, after the completion of the contract and acceptance of the improvement, divide the road into two equal sections, and shall designate the section which each county shall maintain and keep in repair, and therefore each of said counties shall maintain and keep in repair the sections of the road so assigned to it. **Expenses equally divided.**

6. Said joint board may choose a chairman and secretary and such other officers, and may make such rules for government as shall be deemed advisable; the said joint board shall have power to meet and adjourn from time to time, and as often as in their judgment it shall be deemed necessary to fully carry into effect the provisions of this act; the votes of a majority of the members of the board of each county voting separately shall be necessary to decide any question, order, motion or resolution which may come before the said joint board; the secretary of said joint board and the engineer and supervisor appointed shall receive such com- **Maintenance.**

Method of transacting business by joint board.

Compensation.

compensation for their services as the said joint board shall, as aforesaid, determine to be just and proper; the members of said board shall be entitled to the same compensation as is allowed to them as members of the board of chosen freeholders, and shall comply with the provisions of and receive the benefits from the act to which this is a supplement, as far as the same is consistent and practical.

7. This act shall take effect immediately.

Approved March 23, 1898.

An Act to provide for the acquirement of turnpike roads for free public use.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Turnpike roads may be acquired for public use.

1. Whenever there shall be presented to the state commissioner of public roads a petition signed by the owners of at least two-thirds of the land and real estate fronting or bordering on any turnpike road, praying that said road may be acquired for free public use, and setting forth that they are willing that the peculiar benefits conferred on the lands fronting or bordering on said road shall be assessed thereon to an amount not exceeding ten per centum of the entire cost of the said road, then the governor shall appoint five commissioners from the county or counties through which the said road runs; the said commissioners, when appointed, shall take an oath or affirmation faithfully and fairly to perform their duties, and shall thereupon proceed to estimate and determine the fair and just value of the said road, having given ten days' notice of the time and place when and where they will meet to hear any representation in behalf of the said corporation or of the board or boards of chosen freeholders of the various counties through which the said turnpike runs, or of the applying freeholders in the said matter; said notice shall be served upon the president or other chief officer

Commissioners appointed.

Hearings had.

Notice given.

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of said corporation, upon the director or clerk of the said board or boards of chosen freeholders, and shall be published at least one week prior to the time of meeting in one newspaper published in each county through which said turnpike runs; such meeting shall be adjourned from time to time at the discretion of the said commissioners; when the said commissioners shall have arrived at a price or value of the said turnpike road satisfactory to themselves they shall report the same to the road commissioner, who may thereupon ratify the same and report it to the board or boards of chosen freeholders of the counties through which the said road runs, who may thereupon purchase the same; and they are hereby empowered to make temporary loans upon the credit of the said county or counties for the acquirement of the said roads as aforesaid.

Temporary
loans may be
made.

2. One-third of the cost of all roads so acquired under this act shall be paid for out of the state road appropriation; *provided*, that the amount so paid shall not in any one year exceed the amount of twenty thousand dollars; if one-third of such cost shall exceed the sum of twenty thousand dollars the said sum of twenty thousand dollars shall be apportioned by the governor and the state commissioner of public roads among the counties of this state in proportion to the cost of the roads acquired by them for such year, as shown by the statement of cost filed in the office of the state commissioner of public roads; the governor and the said commissioner shall, between December fifteenth and thirty-first in each year, certify to the state comptroller the amount to be paid to each county for such year, and the state comptroller shall thereupon draw his warrants in favor of the respective county collectors for the sums certified to as aforesaid upon the state treasurer, who shall pay the same out of any moneys in the state treasury not otherwise appropriated; *provided, further*, that the cost of all turnpike roads acquired under this act in any county in any one year, together with all roads built or repaired, shall not exceed one-fourth of

Cost.

Proviso.

Proviso.

one per centum of the ratables of such county for the last preceding year.

Assessors to include certain amount in county taxes.

3. On or before August first in each and every year it shall be the duty of the board of chosen freeholders to certify to the county board of assessors, either in the annual tax budget or separately, the two-thirds of the cost of all turnpike roads acquired so as aforesaid during the year, and the county board of assessors shall include the sum so certified in the county taxes assessed for such year, and the same shall be assessed, collected and paid over to the county in the same manner and within the same time that other county taxes are assessed, collected and paid over; if a deficiency shall exist in consequence of the receipt of less than one-third of the cost from the state treasury, the board of chosen freeholders shall have authority to borrow on temporary loans to the amount of such deficiency until the next annual taxes shall be assessed, collected and paid over to the county.

Deficiency.

If the road is in more than one county.

4. If the said road shall run through more than one county the petition to the state commissioner of public roads shall be signed by at least two-thirds of the owners of the land and real estate bordering on said road in each county before the governor shall be required to appoint the five commissioners mentioned in the first section of this act; and each of the said counties shall bear the expenses of the acquirement of the said road in proportion to the length thereof within the said counties, and all proceedings after the appointment of the said five commissioners that may be required by virtue of this act shall be had separately and independently in each of the said counties.

Road to be free and maintained by county.

5. Any road so acquired shall forever thereafter be a free county road, and the duty of keeping the same in good order and repair shall devolve upon the county officers in like manner as heretofore provided for free stone roads.

Benefits assessed by commissioners appointed by court.

6. When the said turnpike roads shall have been so acquired the board of chosen freeholders shall apply to

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the circuit court of the county for the appointment of commissioners to estimate and assess the peculiar benefits conferred by such acquirement upon the lands and real estate bordering on the road so acquired, of the time and place of which application notices shall be given by ten days' publication in two daily newspapers printed and circulating within the said counties, then by two weeks' publication in two weekly newspapers printed and circulating therein, at which time and place or at such other time and place as the court shall designate, shall, without unnecessary delay, appoint three commissioners who shall be freeholders, and residents of the county in which the application is made, to assess the benefits aforesaid; the said court shall have power to remove any commissioner and appoint another in his place and also to fill any vacancy that may occur in the office of any commissioner at any time.

7. The said commissioners shall then proceed in like manner as the commissioners appointed to assess the benefits conferred by the improvement of the public roads of this state under and by virtue of an act of the legislature entitled "An act to provide for the permanent improvement of the public roads of this state," approved March twenty-second, one thousand eight hundred and ninety-five, and the supplements thereto, and the report of the said commissioners when filed and approved shall be a lien upon the properties assessed in like manner, and the said assessment shall be collected in like manner as the assessment in the said act last before mentioned.

8. This act shall take effect immediately.

Approved May 11, 1897.

Method of
assessing
benefits.

CHAPTER 132.

An Act to provide for the acquirement of turnpike roads for free public use, and for the permanent improvement and maintenance of the same.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Acquirement
of turnpike
road for free
public use.

1. Whenever there shall be presented to the state commissioner of public roads a petition signed by the owners of at least two-thirds of the land and real estate fronting or bordering on any turnpike road, praying that said road may be acquired for free public use, and setting forth that they are willing that the peculiar benefits conferred on the lands fronting or bordering on said road shall be assessed thereon to an amount not exceeding ten per centum of the entire purchase price of the said road, together with the amount necessary to resurface, rebuild or improve the said road in the manner prescribed for other roads in the act entitled "An act to provide for the permanent improvement of the public roads in this state," approved March twenty-second, anno domini one thousand eight hundred and ninety-five, and the supplements thereto, said commissioner shall thereupon notify the governor of such action and the governor shall thereupon appoint five commissioners from the county or counties through which the said road runs; the said commissioners when appointed shall take an oath or affirmation faithfully and fairly to perform their duties, and shall thereupon proceed to estimate and determine the fair and just value of the said road and of the portions thereof in each county in which the same is located, having given ten days' notice of the time and place when and where they will meet to hear any representation in behalf of the said corporation or of the board or boards of chosen freeholders of the various counties through which the said road runs, or of the applying freeholders in the said matter; said notice shall be served upon the presi-

Appointment
of commis-
sioners by
governor.

Hearing.

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dent or other chief officer of the turnpike company, upon the director of the said board or boards of chosen freeholders, and shall be published at least one week prior to the time of meeting in one newspaper published in each county through which said turnpike runs; such meeting shall be adjourned from time to time at the discretion of the said commissioners; when the said commissioners shall have arrived at a price or value of the said turnpike road satisfactory to themselves they shall report the same to the state commissioner of public roads, who may thereupon ratify the same and report it to the board or boards of chosen freeholders of the counties through which the said road runs, which said board may thereupon purchase the same or whenever the board of chosen freeholders of any county in this state shall agree with the owner or owners of any turnpike road or toll road within such county upon the price to be paid for such turnpike road or toll road, and shall by resolution accept the same, and said proceeding be approved by the state commissioner of public roads in writing, said board may thereupon purchase the same and said road shall be paid for and maintained as a county road as hereinafter provided for; and they are hereby empowered to make temporary loans upon the credit of the said county or counties for the acquirement of the said roads as aforesaid.

Report to state
commissioner
of roads.

2. One-third of the cost of all roads so acquired, together with one-third of the amount expended in improving the same as aforesaid, which improvement shall be made in the manner prescribed for the roads under the aforesaid act, shall be paid for out of the state road appropriation; *provided*, that the amount so paid shall not in one year exceed the amount of forty thousand dollars; if one-third of such cost shall exceed the sum of forty thousand dollars, the said sum of forty thousand dollars shall be appropriated by the governor and state commissioner of public roads among the counties of this state in proportion to the cost of the roads acquired by them for such year as shown by the statement

One-third paid
from state
appropriation.

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of cost filed in the office of the state commissioner of public roads; the governor and the said commissioner shall, between December fifteenth and thirty-first in each year, certify to the state comptroller the amount to be paid to each county for such year, and the state comptroller shall thereupon draw his warrants in favor of the respective county collectors for the sums certified to as aforesaid upon the state treasurer, who shall pay the same out of any moneys in the state treasury not otherwise appropriated; *provided further*, that the cost of all turnpike roads acquired under this act in any county in any one year, together with all roads built or repaired, shall not exceed one-half of one per centum of the ratables of such county for the last preceding year.

Proviso.

Duty of county board of assessors.

3. On or before August first in each and every year it shall be the duty of the board of chosen freeholders to certify to the county board of assessors, either in the annual tax budget or separately, the two-thirds of the cost of purchasing and improving of all turnpike roads acquired and improved as aforesaid during the year, and the county board of assessors shall include the sum so certified in the county tax assessed for such year, and the same shall be assessed, collected and paid over to the county in the same manner and within the same time that other county taxes are assessed, collected and paid over; if a deficiency shall exist in consequence of the receipt of less than one-third of the cost from the state treasury, the board of chosen freeholders shall have authority to borrow on temporary loans to the amount of such deficiency until the next annual taxes shall be assessed, collected and paid over to the county.

Loan to meet deficiency.

When turnpike in two or more counties.

4. If the said road shall run through more than one county the petition to the state commissioner of public roads shall be signed by at least two-thirds of the owners of the land and real estate bordering on said road in each county before the governor shall be required to appoint the five commissioners mentioned in the first section of this act; and each of the said counties shall bear the ex-

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pense of the acquirement of the said road in proportion to the value thereof within the said counties, and all proceedings after the appointment of the said five commissioners that may be required by virtue of this act shall be had separately and independently in each of the said counties.

5. Any road so acquired shall forever thereafter be a free county road, and shall be kept in good order and repair and in the same manner as are other county roads.

Maintenance.

6. When the said turnpike roads shall have been so acquired and improved by petition as aforesaid the board of chosen freeholders shall apply to the circuit court of the county for the appointment of commissioners to estimate and to assess the peculiar benefits conferred by such acquirement and improvement upon the lands and real estate bordering on the road so acquired and improved, of the time and place of which application notices shall be given by ten days' publication in two daily newspapers printed and circulating within the said counties, or by four weeks' publication in two weekly newspapers printed and circulating therein, at which time and place, or such other time and place as the court shall designate, shall, without unnecessary delay, appoint three commissioners, who shall be freeholders and residents of the county in which the application is made, to assess the benefits aforesaid; the said court shall have power to remove any commissioner and appoint another in his place, and also fill any vacancy that may occur in the office of any commissioner at any time.

Assessment of benefits.

7. The said commissioners shall then proceed in like manner as the commissioners appointed to assess the benefits conferred by the improvement of the public roads of this state under and by virtue of an act of the legislature entitled "An act to provide for the permanent improvement of the public roads of this state," approved March twenty-second, one thousand eight hundred and ninety-five, and supplements thereto, and the report of the said commissioners when filed and approved shall be a lien upon the properties assessed in

Manner of assessment.

Report a lien.

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like manner, and the said assessment shall be collected in like manner as the assessment in the said act last before mentioned.

8. This act shall take effect immediately.

Approved March 22, 1901.

 VACATION OF TURNPIKE.

SUPPLEMENT.

Approved February 13, 1884.

Deed of cession and transfer of turnpike road, how executed and filed

Sec. 1. That whenever any turnpike company of this state shall execute to any city, township or other municipality of this state, a deed of cession and transfer of all or any part of any turnpike road lying within the limits of any such city, township or other municipality, and shall have the same duly proven in the manner required for the proof of deeds or conveyances of lands, and shall deliver the same, together with a map or survey of the road, or of the part of road so ceded and transferred to the common council, township committee or other governing board of such city, township or other municipality, and the said common council, township committee or other governing board shall accept the said deed of cession and transfer, by a writing indorsed thereon, the said deed, proof, map or survey and acceptance shall then be recorded in the office of the clerk of the county in which the road so ceded and transferred lies, in the book containing the records of public roads for said county, and after being so recorded shall be filed in the office of the secretary of state; *provided*, that where the charter or act of incorporation of any city or other municipality prescribes the manner in which deeds of dedication of lands for public highways or streets shall be accepted, the proceedings for the acceptance of any deed of cession and transfer by a turnpike company as aforesaid shall, in any such city or other municipality, be the same as is re-

Proviso.

quired for the acceptance of a deed of dedication of lands for a public highway or street.

Sec. 2. That any turnpike company making a cession and transfer of any part of their turnpike road in the manner aforesaid, shall, from the date of filing the deed of cession and transfer in the office of the secretary of state, be released and discharged from all authority and control over the part or parts of their road so ceded and transferred, and from all liability on account of the same, and the same shall thereafter be to all intents and purposes a public road or highway in such city, township or other municipality, and be subject to the same jurisdiction, authority and control by such city, township or other municipality, as it has over other public roads or highways within the limits thereof.

Company released from control, &c., of part of road ceded when deed is filed in office of secretary of state.

An Act authorizing turnpike companies to vacate or dispose of a portion of its road and property.

Approved April 20, 1885.

Sec. 1. That when any turnpike company in this state may deem it advisable to dispose or vacate any portion of their road not in excess of one-half of its entire length, they shall hereby have the power and privilege of so doing at any time when the same may be favored by a vote represented by those owning two-thirds of the capital stock of said company, to be voted at a special meeting of said stockholders called by the officers of said company, and the notice of said meeting being published in at least one newspaper in each county where said road is located, for the space of thirty days, once in each week, said notice to state the time and object of said meeting; the said stockholders may, by a vote represented by those owning two-thirds of the capital stock of said company, authorize and empower their president and secretary to sell or vacate to the freeholders of the county or counties the portion so desired; and if vacated without compensation, a com-

When turnpike company may vacate or dispose of portion of road.

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mittee of the board of freeholders of the county or counties may view the same and report to the said board upon what terms they have agreed to take said road, and the action of a majority of said board of freeholders in accepting or rejecting said report shall be final.

An Act to authorize turnpike companies to abandon a portion of their roads and property.

Passed June 1, 1886.

Sec. 1. That any turnpike company in this state may abandon any portion of their road not exceeding two-thirds of the entire length of the road, when the same may be favored by a vote of those owning a majority of the capital stock of said company; the resolution to abandon a portion of said turnpike shall describe the part so abandoned, and shall be signed by the president and secretary of said turnpike company, duly acknowledged before an officer authorized to take the acknowledgment of deeds in this state, and shall thereupon be recorded in the office of the clerk of the county wherein such turnpike company is situated; *provided*, that the part of said turnpike so abandoned shall be in all respects in as good repair as when the said company began operating the same.

BROAD TIRES.

CHAPTER 76.

An Act to amend an act entitled "An act to enable township committees to encourage the use of broad tires on wagons and carts by a rebatement of taxes."

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That section one of an

Turnpike companies may abandon portion of road.

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act entitled "An act to enable township committees to encourage the use of broad tires on wagons and carts by a rebatement of taxes," approved March sixteenth, one thousand eight hundred and ninety-three, which reads as follows:

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That township committees be and they are hereby authorized, when in their judgment it is for the public good, to pass an ordinance allowing a rebate of taxes for township or road purposes to all owners or possessors of wagons and carts used in said township for transportation of goods, wares, merchandise, produce, passengers, and for general farm, freight and express purposes, having tires of not less than four inches in width; *provided*, the said rebate shall not exceed fifty cents for each wheel in use in any one year," be and the same is hereby amended so as to read as follows:

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That township committees be and they are hereby authorized, when, in their judgment, it is for the public good, to pass an ordinance allowing a rebate of taxes for township or road purposes to all owners or possessors of wagons and carts used in said township for transportation of goods, wares, merchandise, produce, passengers, and for general farm, freight and express purposes, having tires of not less than four inches in width; *provided*, the said rebate shall not exceed one dollar for each wheel in use in any one year.

2. That this act shall take effect immediately.

Passed March 24, 1896.

CHAPTER 63.

A Supplement to an act entitled "An act to provide for the acquirement of turnpike roads for free public use," approved May eleventh, one thousand eight hundred and ninety-seven.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

Compensation.

1. The pay of the commissioners heretofore or hereafter appointed under said act shall be a sum not exceeding five dollars per day, and necessary expenses not exceeding two dollars per day, for actual number of days employed in such service.

Settlement when road not accepted.

2. If the freeholders of the county or counties fail to accept the turnpike roads appraised under the act to which this is a supplement within twelve months after the commission have submitted their award to the state road commissioner, the bill of said commissioners, upon the approval of the state road commissioner and the signature of the governor, shall be presented to the comptroller of the state, who thereupon shall draw his warrant therefor upon the state treasurer, who shall pay the same out of the annual state appropriation for roads.

3. This act shall take effect immediately.

Approved March 20, 1900.

CHAPTER 133.

A Supplement to an act entitled "An act to provide for the acquirement of turnpike roads for free public use, and for the permanent improvement and maintenance of the same," approved March twenty-second, one thousand nine hundred and one.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. When any commissioner heretofore or hereafter ap-

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pointed under the act to which this act is a supplement shall die pending the proceedings under the said act to which this act is a supplement or shall be disqualified or shall be unable to act or shall fail or refuse to act and perform the duties of his appointment, the other four commissioners appointed under said act shall proceed to perform the duties of their appointment with the same powers and effect as if all the commissioners were acting, and a report signed by the other four of said commissioners shall have the same force and effect as a report signed by all of the commissioners appointed under the said act, and a majority of said commissioners shall have power to adjourn their meetings from time to time.

2. When any commissioner heretofore appointed under the act to which this act is a supplement shall have died pending the proceedings under the said act, or shall have been disqualified or unable to act or shall have failed or refused to act and to perform the duties of his appointment or to attend the meetings of the commissioners appointed under the said act, all the proceedings heretofore had and acts heretofore performed by the other four of the commissioners appointed under the said act are hereby confirmed and made valid, legal and effectual to the same extent that the same would have been valid, legal and effectual if all the commissioners appointed under the said act had taken part in all of said proceedings.

3. This act shall take effect immediately.

Approved March 28, 1904.

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CHAPTER 138.

A Further Supplement to an act entitled "An act to provide for the control and operation of roads and bridges owned or claimed to be owned by any plank road company whose charter has expired or may expire," approved March twenty-second, one thousand nine hundred and one.

BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey:*

1. After such road shall have been acquired and taken possession of by any board or boards of chosen freeholders of any county or counties in this state, such road may be widened to any width not exceeding one hundred feet, provided the board or boards of chosen freeholders of the county or counties in which said road may lie and be situate shall adopt a resolution determining that such widening is of public importance and setting forth the width proposed, and the location of said widening, and the points between which such widening is to be made; such resolution, in case said road lies in two or more counties, shall receive the approval of each of said counties before the same shall be valid and operative.

2. The title to the lands required for such widening may be acquired by gift, devise, purchase or condemnation, and shall vest in the county corporation of the county or counties within the territorial limits of which the lands acquired may lie, respectively, and the cost and expense of acquiring such lands shall be paid by the county within which the same shall lie; but nothing in this act contained shall be construed to alter or in anywise affect the provisions of law under which such road, including the bridges thereof, are or shall be constructed, renewed, repaired or maintained.

3. This act shall take effect immediately.

Approved March 28, 1904.

CHAPTER 98.

Further Supplement to an act entitled "An act concerning roads," approved April sixteenth, eighteen hundred and forty-six.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

1. The owner or occupant of land abutting on any highway in any township in this state shall, during the month of September of each year, cut and remove all brush, briars and weeds growing in or upon such portion of such highway as his or her lands abut upon, and in case such owner or occupant shall fail to perform the duty imposed hereby, the township committee of the township in which such lands abut as aforesaid shall cause such work to be done and the owner of such lands shall pay the expense thereof, with costs, to be recovered in an action upon contract before any justice of the peace of the county at the suit of such township committee.

Highway must be kept clear of weeds &c.

2. This act shall take effect immediately.

Approved March 23, 1900.



An Act for the better protection of travelers, pedestrians, vehicles and animals on the public streets and highways.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

1. Whoever places upon the surface of any public street, highway or other way customarily and lawfully used for public travel, or upon any sidewalk appurtenant to such way, any broken glass, bottle, metal, loose stones, earthenware, or other substance of a nature likely to cause injury to travelers or pedestrians, or to carriages,

Penalty for placing glass, bottles &c. upon public highways.

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bicycles or other vehicles traveling or moving on said way, or which might wound, disable or injure any horse or other animal, or which might injure, cut or puncture any pneumatic tire, shall forfeit for each offense five dollars, to be sued for and recovered in an action of debt by any person who will sue for the same.

Broken stone of dimension of one inch or more placed on highways to be covered.

2. Any overseer of the highways, committeeman, contractor, or other person whomsoever, who shall place or spread broken stone on any of the highways of this state, for the purpose of improving or repairing the same, shall, if such stone be of the dimension of an inch and one-half or more in diameter, cause the same to be covered with fine stone, earth or screenings, within such period of time as it shall be possible to obtain such fine stone, earth or screenings after said broken stones are spread upon said road, unless prevented by causes beyond his control, under a penalty of twenty dollars for each offense, to be sued for in an action of debt and recovered with costs by any person who shall be injuriously affected by the willful neglect or failure to cover said stone as herein provided.

3. This act shall take effect immediately.

Approved May 12, 1896.

APPENDIX C.

NEW JERSEY.

1. All taxes are to be paid in money.
2. The office of overseer of highway is abolished.

3. The roads of a township are placed under the management of the township committee, and money may be raised by township bonds for grading, macadamizing and improving the same; bonds to be authorized by vote at the annual town meeting.

4. Under the County act, the Board of Chosen Freeholders of any county may designate certain roads as county roads, and improve the same by the issue of county bonds; townships to pay one-third of the cost.

5. Under the new County State Aid law, the freeholders may declare any road a county road, and by resolution improve same, or whenever the owners of two-thirds of the lands fronting on any public road petition for same the freeholders can require the township in which the road lies to pay one-tenth of the cost of improving such road, the State paying one-third of the cost up to, at present, the limit of \$250,000 per year.

This act extends to townships, towns, boroughs, villages or any municipality or municipalities, all proceedings conforming, as near as possible, to the provisions of this act, and the governing bodies of any township, town, borough, village or municipality shall have the same power and perform the same duties as are conferred and devolve upon the Board of Chosen Freeholders under the provisions of this act.

6. Under the act for the acquirement of turnpike roads for free public use, whenever the owners of two-thirds of the land fronting on any turnpike toll-road

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pray that said road may be acquired for free public use, and that they are willing to pay ten per cent. of the entire cost of such road, the Governor appoints five commissioners to estimate and determine the fair and just value of said road; after having arrived at such value, if the State Road Commissioner ratifies the same, the board may purchase, the State paying one-third of the cost and the county paying the balance, two-thirds, or whenever the Board of Chosen Freeholders of any county in this State shall agree with the owner or owners of any turnpike road or toll road within such county upon the price to be paid for such turnpike road or toll road, and shall by resolution accept the same, and said proceeding be approved by the State Commissioner of Public Roads in writing, said board may thereupon purchase the same.

7. Whenever the Board of Chosen Freeholders purchases a turnpike road and the State Commissioner of Public Roads approves of the same, the State pays one-third of the cost.

LAYING OUT ROADS.

Receiving many inquiries how to proceed to lay out roads, change location, &c., to save correspondence we give the following quotations from the statutes:

Laying out Roads by Freeholders after General Election.

It shall be lawful for the Board of Chosen Freeholders of any of the several counties of this State when said board deem it for the best interests of such county, to lay out, construct and maintain public roads extending through such county in any direction, to submit, by resolution, the question whether or not such public roads shall be laid out, to the electors of said county, at an election, to be held at the same time and place of holding the general election in and for said county for members of the General Assembly of this State, by the same officers, but in separate ballot-box, and if, at such

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election, a majority of the electors shall vote "against public roads," nothing in this act shall apply or be effective in said county; but if a majority of the electors vote "in favor of public roads," then the board shall proceed as directed by the act entitled "An act to authorize the board of chosen freeholders of any of the several counties of this state to lay out, open, construct, improve and maintain a public road therein," approved April 7th, 1888. P. L. 1888, page 397.

LAYING OUT, VACATING OR ALTERING PUBLIC ROADS BY
SURVEYORS OF HIGHWAYS. (Revised Statutes,
page 2828-119, Sec. 1.)

That when ten or more persons, being freeholders, shall think a public road necessary, or any public road which hath been or shall be laid out unnecessary, or any alteration in such road necessary in any part of the county in which they reside, it shall be lawful for the said persons to make application in writing to the inferior court of common pleas of the said county, in open court, having given previous notice for at least ten days of such intended application, and also of the day on which such application is intended to be made, by advertisements under their hands, and set up at three of the most public places in the township in which the said road is proposed to be laid out, vacated or altered, and if there be more townships than one through which the said road may run, by advertisements to be set up at three of the most public places in each township; and the said court, when applied to as aforesaid, on due proof being made that the advertisements have been set up according to law, on which the judgment of the court shall be final and conclusive, are hereby authorized and required to appoint six of the surveyors of the highways of the said county, ever having regard to the appointment of the surveyors of the highways of the township or townships where the said road shall be so applied for to be laid out, vacated or altered;

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provided, that no surveyor shall be appointed through whose land the road may run, or who for any other reason which the court in their discretion shall deem sufficient, think ought not to be appointed; and the said surveyors shall meet at such time and place as the said court shall direct, a copy of which appointment shall be served on each of the said surveyors at least six days prior to the time of their meeting; and two of the said applicants shall, at least twelve days prior to the said time, sign and set up advertisements at three of the most public places in the said township or townships, setting forth the time and place of the meeting of the surveyors agreeably to the directions of the court, and designating the points or places from and to which the said road is proposed to be laid out, vacated or altered. (See Secs. 138 and 168, *post*.)

VACATION AND RELAYING OF PUBLIC ROADS BY FILING
CONSENT WITH CLERK AND RECORDING.

138. Sec. 1. That whenever ten or more persons, being freeholders, shall think any alteration of any public road necessary in any part of the county wherein they reside, by having such road or a portion thereof vacated, and the same relaid or another road substituted therefor, they may make application in writing to the inferior court of common pleas of such county, or to one of the judges thereof, setting forth in writing the road or portion thereof as aforesaid which it is proposed to have vacated, describing the same by courses and distances, and also describing the road as it is to be relaid, or the road which is to be substituted therefor, to which description there shall be attached a map showing the location of the road or portion of road to be vacated and the road as relaid, or the road which is to be substituted therefor; and if within ten days after such application shall have been made as aforesaid, or if at the time of making such application there shall be presented to said court or judge the consent in writing

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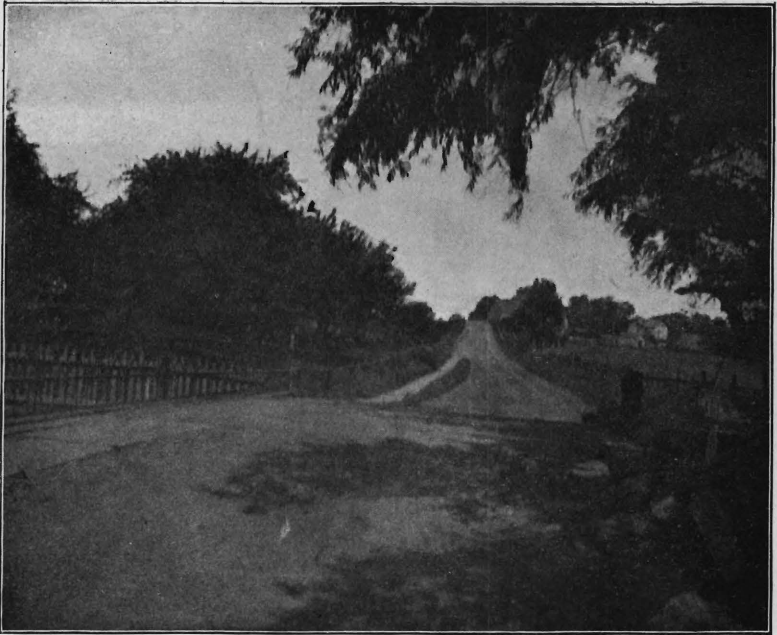
of the owners of all the lands intersected by such old road or portion thereof proposed to be vacated, and of all the property intersected by the road as proposed to be relaid, or by the road which it is proposed to substitute therefor, and also the written consent of the township committee of the township wherein such road or roads do lie, that said application shall be granted, then it shall be lawful for said court or judge to cause said application, with the accompanying survey, map and return, and the written consents of the owners of lands as aforesaid, and of the township committee, to be filed with the clerk of the county, to be by him recorded in the book of roads for said county; and when said application and other papers shall have been so filed, such old road or portion thereof shall thereupon and thereby be deemed to be vacated, and the road is relaid, or the new road substituted therefor, shall thereupon and thereby be deemed and taken to be a public road.

VACATION OF PUBLIC ROADS BY CONSENT AND FILING
WITH COUNTY CLERK.

186. Sec. 1. That whenever ten or more persons, being freeholders, shall think the vacation of a part of any public road necessary in any part of the county wherein they reside, they may make application in writing to the inferior court of common pleas of such county, or to one of the judges thereof, setting forth in writing the road or portion thereof which it is proposed to have vacated, describing the same by courses and distances, to which description there shall be attached a map showing the location of the road, or portion thereof to be vacated, and if within ten days after such application shall have been made as aforesaid, or if at the time of making such application, there shall be presented to said court or judge the consent in writing of the owners of all the lands by such old road or portion thereof proposed to be vacated, and also the written consent of the township committee of the township

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wherein such lands do lie, that such application shall be granted, then it shall be lawful for said court or judge to cause said application, with the accompanying survey, map and return, and the written consents of the owners of lands as aforesaid, and of the township committee to be filed with the clerk of the county to be by him recorded in the book of roads for said county, and when said application and papers have been so filed, such portion of such old road shall thereupon and thereby be deemed to be vacated; *provided*, that no portion of any old road proposed to be vacated under this act shall exceed one thousand yards in length.



Stewartville road, Warren Co., before improvement.



Stanhope and Newton road, Sussex Co., before improvement.

APPENDIX D.

Number of tons of stone per mile required to build the following depths and widths.

For the information of intending road builders, we have compiled the following tables, which approximate the number of tons of thoroughly-rolled stone necessary to construct each mile at the designated depths and widths.

The basis is 3,000 tons of loose stone or 3,500 tons of compressed stone for a road one mile long, sixteen feet wide and eight inches deep. A road eight inches deep, when finished, will have required at least ten inches of stone. It should be placed in two layers of five inches each, and each layer rolled down to four inches. Then the application of the three-quarter inch and screenings will bring the road to the prescribed depth; for other thickness the stone should be placed in proportion to the intended finished depths.

An observance of this rule will insure the contract thickness for the roadbed, and save the sometimes necessary expense of resurfacing before acceptance from the contractor.

A road 8 feet wide and 4 inches deep will require					875	tons of stone per mile.			
"	8	"	6	"	"	1,312½	"	"	"
"	8	"	8	"	"	1,750	"	"	"
"	8	"	10	"	"	2,187½	"	"	"
"	8	"	12	"	"	2,625	"	"	"
"	9	"	4	"	"	984¾	"	"	"
"	9	"	6	"	"	1,476 9-16	"	"	"
"	9	"	8	"	"	1,968¾	"	"	"
"	9	"	10	"	"	2,460 15-16	"	"	"
"	9	"	12	"	"	2,953¼	"	"	"
"	10	"	4	"	"	1,093¾	"	"	"
"	10	"	6	"	"	1,640⅝	"	"	"
"	10	"	8	"	"	2,187½	"	"	"
"	10	"	10	"	"	2,734¾	"	"	"
"	10	"	12	"	"	3,281¼	"	"	"
"	11	"	4	"	"	1,203¼	"	"	"
"	11	"	6	"	"	1,804 11-16	"	"	"
"	11	"	8	"	"	2,406¼	"	"	"
"	11	"	10	"	"	3,007 13-16	"	"	"
"	11	"	12	"	"	3,609¾	"	"	"

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A road 12 feet wide and 4 inches deep will require					1,312½	tons of stone per mile.
"	12	"	6	"	1,968¾	" " "
"	12	"	8	"	2,625	" " "
"	12	"	10	"	3,281¼	" " "
"	12	"	12	"	3,937½	" " "
"	13	"	4	"	1,421⅞	" " "
"	13	"	6	"	2,132	13-16 " " "
"	13	"	8	"	2,843¾	" " "
"	13	"	10	"	3,554	11-16 " " "
"	13	"	12	"	4,265⅝	" " "
"	14	"	4	"	1,531¼	" " "
"	14	"	6	"	2,296⅞	" " "
"	14	"	8	"	3,062½	" " "
"	14	"	10	"	3,828⅞	" " "
"	14	"	12	"	4,593¾	" " "
"	15	"	4	"	1,640⅝	" " "
"	15	"	6	"	2,460	15-16 " " "
"	15	"	8	"	3,281¼	" " "
"	15	"	10	"	4,101	9-16 " " "
"	15	"	12	"	4,921⅞	" " "
"	16	"	4	"	1,750	" " "
"	16	"	6	"	2,625	" " "
"	16	"	8	"	3,500	" " "
"	16	"	10	"	4,375	" " "
"	16	"	12	"	5,250	" " "
"	17	"	4	"	1,859⅝	" " "
"	17	"	6	"	2,789	1-16 " " "
"	17	"	8	"	3,718¾	" " "
"	17	"	10	"	4,648	7-16 " " "
"	17	"	12	"	5,578⅞	" " "
"	18	"	4	"	1,968¾	" " "
"	18	"	6	"	2,953⅞	" " "
"	18	"	8	"	3,937½	" " "
"	18	"	10	"	4,921⅞	" " "
"	18	"	12	"	5,906¼	" " "
"	19	"	4	"	2,078⅞	" " "
"	19	"	6	"	3,117	3-16 " " "
"	19	"	8	"	4,156¼	" " "
"	19	"	10	"	5,195	5-16 " " "
"	19	"	12	"	6,234⅞	" " "
"	20	"	4	"	2,187½	" " "
"	20	"	6	"	3,281¼	" " "
"	20	"	8	"	4,375	" " "
"	20	"	10	"	5,468¾	" " "
"	20	"	12	"	6,562½	" " "

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TABLES.

As many persons interested in the construction of stone roads are asking questions about their cost, we enclose a table to show at a glance the number of square yards at different widths in a mile of road; also the cost at different widths and various prices per square yard. Any variations from these prices can be quickly ascertained by adding, subtracting, multiplying and dividing for a less or greater width. For example, a road eight feet wide has 4,693 1-3 square yards in one mile. To obtain the number of square yards in a road having a width of nine feet, add one-eighth to the foregoing figures, and in one having a width of seven feet, subtract one-eighth; in one of twice the width given in the table multiply by two.

SQUARE YARDS IN ONE MILE OF

8 feet in width.....	4,693 1-3	square yards.
10 "	5,866 2-3	"
12 "	7,040	"
14 "	8,213 1-3	"
16 "	9,386 2-3	"
18 "	10,560	"
8 feet wide, or 4,693 1-3 square yards, at 25c. per yard.....	\$1,173 33 1-3	
10 " 5,866 2-3 " 25c. "	1,466 66 2-3	
12 " 7,040 " 25c. "	1,760 00	
14 " 8,213 1-3 " 25c. "	2,053 33 1-3	
16 " 9,386 2-3 " 25c. "	2,346 66 2-3	
18 " 10,560 " 25c. "	2,640 00	
8 " 4,693 1-3 " 30c. "	\$1,408 00	
10 " 5,866 2-3 " 30c. "	1,760 00	
12 " 7,040 " 30c. "	2,112 00	
14 " 8,213 1-3 " 30c. "	2,464 00	
16 " 9,386 2-3 " 30c. "	2,816 00	
18 " 10,560 " 30c. "	3,168 00	
8 " 4,693 1-3 " 35c. "	\$1,642 66 2-3	
10 " 5,866 2-3 " 35c. "	2,053 33 1-3	
12 " 7,040 " 35c. "	2,464 00	
14 " 8,213 1-3 " 35c. "	2,874 66 2-3	
16 " 9,386 2-3 " 35c. "	3,285 33 1-3	
18 " 10,560 " 35c. "	3,696 00	
8 " 4,693 1-3 " 40c. "	\$1,877 33 1-3	
10 " 5,866 2-3 " 40c. "	2,346 66 2-3	
12 " 7,040 " 40c. "	2,816 00	
14 " 8,213 1-3 " 40c. "	3,285 33 1-3	
16 " 9,386 2-3 " 40c. "	3,754 66 2-3	
18 " 10,560 " 40c. "	4,224 00	

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	8 feet wide, or	4,693 1-3 square yards, at 45c. per yard.....			\$2,112 00
10	"	5,866 2-3	"	45c. "	2,640 00
12	"	7,040	"	45c. "	3,168 00
14	"	8,213 1-3	"	45c. "	3,696 00
16	"	9,386 2-3	"	45c. "	4,224 00
18	"	10,560	"	45c. "	4,752 00
8	"	4,693 1-3	"	50c. "	\$2,346 66 2-3
10	"	5,866 2-3	"	50c. "	2,933 33 1-3
12	"	7,040	"	50c. "	3,520 00
14	"	8,213 1-3	"	50c. "	4,106 66 2-3
16	"	9,386 2-3	"	50c. "	4,693 33 1-3
18	"	10,560	"	50c. "	5,280 00
8	"	4,693 1-3	"	55c. "	\$2,581 33 1-3
10	"	5,866 2-3	"	55c. "	3,226 66 2-3
12	"	7,040	"	55c. "	3,872 00
14	"	8,213 1-3	"	55c. "	4,517 33 1-3
16	"	9,386 2-3	"	55c. "	5,162 66 2-3
18	"	10,560	"	55c. "	5,808 00
8	"	4,693 1-3	"	60c. "	\$2,816 00
10	"	5,866 2-3	"	60c. "	3,520 00
12	"	7,040	"	60c. "	4,224 00
14	"	8,213 1-3	"	60c. "	4,928 00
16	"	9,386 2-3	"	60c. "	5,632 00
18	"	10,560	"	60c. "	6,336 00
8	"	4,693 1-3	"	65c. "	\$3,050 66 2-3
10	"	5,866 2-3	"	65c. "	3,813 33 1-3
12	"	7,040	"	65c. "	4,576 00
14	"	8,213 1-3	"	65c. "	5,338 66 2-3
16	"	9,386 2-3	"	65c. "	6,101 33 1-3
18	"	10,560	"	65c. "	6,864 00
8	"	4,693 1-3	"	70c. "	\$3,285 33 1-3
10	"	5,866 2-3	"	70c. "	4,106 66 2-3
12	"	7,040	"	70c. "	4,928 00
14	"	8,213 1-3	"	70c. "	5,749 33 1-3
16	"	9,386 2-3	"	70c. "	6,570 66 2-3
18	"	10,560	"	70c. "	7,392 00
8	"	4,693 1-3	"	75c. "	\$3,520 00
10	"	5,866 2-3	"	75c. "	4,400 00
12	"	7,040	"	75c. "	5,280 00
14	"	8,213 1-3	"	75c. "	6,160 00
16	"	9,386 2-3	"	75c. "	7,040 00
18	"	10,560	"	75c. "	7,920 00

COMMISSIONER OF PUBLIC ROADS.

	8 feet wide, or 4,693 1-3 square yards, at 80c. per yard.....				\$3,754 66 2-3
10	" 5,866 2-3	"	80c.	"	4,693 33 1-3
12	" 7,040	"	80c.	"	5,632 00
14	" 8,213 1-3	"	80c.	"	6,570 66 2-3
16	" 9,386 2-3	"	80c.	"	7,509 33 1-3
18	" 10,560	"	80c.	"	8,448 00
8	" 4,693 1-3	"	85c.	"	\$3,989 33 1-3
10	" 5,866 2-3	"	85c.	"	4,986 66 2-3
12	" 7,040	"	85c.	"	5,984 00
14	" 8,213 1-3	"	85c.	"	6,981 33 1-3
16	" 9,386 2-3	"	85c.	"	7,978 66 2-3
18	" 10,560	"	85c.	"	8,976 00
8	" 4,693 1-3	"	90c.	"	\$4,224 00
10	" 5,866 2-3	"	90c.	"	5,280 00
12	" 7,040	"	90c.	"	6,336 00
14	" 8,213 1-3	"	90c.	"	7,392 00
16	" 9,386 2-3	"	90c.	"	8,448 00
18	" 10,560	"	90c.	"	9,504 00
8	" 4,693 1-3	"	95c.	"	\$4,458 66 2-3
10	" 5,866 2-3	"	95c.	"	5,573 33 1-3
12	" 7,040	"	95c.	"	6,688 00
14	" 8,213 1-3	"	95c.	"	7,802 66 2-3
16	" 9,386 2-3	"	95c.	"	8,917 33 1-3
18	" 10,560	"	95c.	"	10,032 00
8	" 4,693 1-3	"	\$1 00	"	\$4,693 33 1-3
10	" 5,866 2-3	"	1 00	"	5,866 66 2-3
12	" 7,040	"	1 00	"	7,040 00
14	" 8,213 1-3	"	1 00	"	8,213 33 1-3
16	" 9,386 2-3	"	1 00	"	9,386 66 2-3
18	" 10,560	"	1 00	"	10,560 00

TABLE FOR GRAVEL.

Table showing number of cubic yards of gravel required in the construction of one mile of gravel road, of widths varying from 6 feet to 20 feet, and depth from 6 to 12 inches. The within quantities should be multiplied by $1\frac{1}{2}$ to give the number of cubic yards of loose gravel required to make the within depths of compact gravel.

ONE MILE IN LENGTH.	Number of feet in width.	Number of cubic yards in road 6 inches deep.	Number of cubic yards in road 7 inches deep.	Number of cubic yards in road 8 inches deep.	Number of cubic yards in road 9 inches deep.	Number of cubic yards in road 10 inches deep.	Number of cubic yards in road 11 inches deep.	Number of cubic yards in road 12 inches deep.
One mile.....	6 ft wide.	58	684	782	880	977	1,075	1,173
“.....	7 “	684	798	912	1,026	1,140	1,254	1,368
“.....	8 “	782	912	1,042	1,173	1,303	1,434	1,564
“.....	9 “	880	1,026	1,173	1,320	1,466	1,613	1,760
“.....	10 “	977	1,140	1,303	1,466	1,629	1,792	1,955
“.....	11 “	1,075	1,254	1,434	1,613	1,792	1,971	2,151
“.....	12 “	1,173	1,368	1,564	1,760	1,955	2,151	2,346
“.....	13 “	1,271	1,482	1,694	1,906	2,118	2,330	2,542
“.....	14 “	1,368	1,597	1,825	2,053	2,281	2,509	2,737
“.....	15 “	1,466	1,711	1,955	2,200	2,444	2,688	2,933
“.....	16 “	1,564	1,825	2,085	2,346	2,607	2,868	3,128
“.....	17 “	1,662	1,919	2,216	2,493	2,770	3,047	3,324
“.....	18 “	1,760	2,053	2,346	2,640	2,933	3,226	3,520
“.....	19 “	1,857	2,167	2,477	2,786	3,096	3,405	3,715
“.....	20 “	1,955	2,281	2,607	2,933	3,259	3,585	3,911

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ROAD MAP OF THE STATE OF NEW JERSEY

From Original Surveys of the U.S. Geological Survey
based on the Triangulation of the U.S. Coast and Geodetic Survey

Scale: 5 miles to 1 inch

1903

Legend

The heavy red lines indicate the principal roads, both under the jurisdiction of the State and under that of the counties, which are shown with broken red lines. The dotted lines indicate the location of the State and county boundaries. The State and county boundaries are shown with broken red lines.

